LECTURES ON

VETERINARY MEDICINE,

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BY MR. YOUATT.

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Lecture XLIV.

THE DISEASES OF THE SENSORIAL SYSTEM.—THE EFFECT AND TREATMENT OF COMPRESSION OF THE BRAIN IN FRACTURE OF THE CRANIUM.—THE HYDATID IN THE SHEEP.—THE SYMPTOMS AND TREATMENT OF THE DISEASE.

I have ventured in a former lecture to hint at the connexion of the medullary portion of the brain with the mere animal principle, and that of the cortical or cineritious part with the intellectual one. I have traced in all our domesticated quadrupeds the prevalence of the former, and the comparatively little development of the latter; and thence it arose, that while the preponderance of animal power enabled them to discharge the services we required from them, the deficiency of that portion in which the various impressions received by the senses are registered and compared, limited their intellectual capacity, and preserved them more securely our slaves. This will enable us to account for the fact, that there are few or no diseases in quadrupeds which strictly and primarily affect and influence the intellectual principle. Quadrupeds may occasionally have the same perverseness of temper, the same vicious habits, that disgrace the human being—sometimes the same ungovernable passions—but nothing of that disturbance of mind, that marked derangement of judgment, which we are accustomed to term insanity. There are, however, certain mechanical affections of the brain which are often productive of fatal consequences. These are principally referable to compression and congestion, or to inflammation.

Effects of Pressure on the Brain.—Fracture.—I have stated, that while considerable portions of the cineritious part may be cut away, without the animal seeming to be scarcely conscious of the act, the smallest pressure could not be made on the brain without impairment of consciousness, or of the power of voluntary motion. The first illustration we have of this, is in fracture of the cranial roof. The broad and flattened expansion of the forehead in the ox, and the use which is made of the horn as a weapon of offence, expose that part of the cranium to occasional fracture. A cow received a wound in this manner. It entered the skull about an inch and a half above the right orbit, and in a line from the internal angle of the orbit to the parietal ridge. She was seen in the morning grazing as usual, but with a glairy bloody fluid running from the corresponding nostril. The herdsman having introduced his finger to ascertain the depth of the wound, the cow fell as by a stroke of lightning, but after lying during two or three seconds insensible, she got up and began to graze again.

A veterinary surgeon was sent for, who, after very cautiously introducing his finger, ascertained that the horn had penetrated through the frontal sinus and the internal plate of the cranial roof, and had actually reached the brain; he contented himself with bleeding her, and administered a dose of physic, and having placed a pledget of tow over the wound, he left her, having ordered her to be confined to the cow-house. She fed and ruminated as usual; but on the third day, when she was taken out to the water, she had no sooner quitted the stable; than she began slowly to turn round and round from the left to the right. She was stopped, and led a little farther on, where she commenced the same rotatory motion, and still in the same direction. She was taken into the house and fastened up, until the medical attendant could be sent for, who ordered her to be immediately destroyed. The horn had penetrated into the right lobe of the brain, through the lateral ventricle, and into the corpus striatum; but the inner plate seemed to have been retracted with the horn, and its fractured edges projected into the frontal sinus, and did not press on the brain. Inflammation marked the course of the horn

through the brain, and decomposition had taken place, attended by a most fetid smell.

In general, however, fracture of the skull is accompanied by pressure of the bone on the brain, and this produces loss of consciousness to a greater or less degree, and usually complete coma.

If it is a horned beast, the practitioner will compare the possibility of giving relief, with the probable injury that the carcass will sustain during the prolonged attempt to effect a cure. If he decides on the adoption of surgical means, he will have recourse to the trephine, and then endeavour to raise the depressed pieces of bone by means of the elevator; but in the majority of cases, and if the animal is in tolerable condition, he will consign it at once to the butcher.

The cranium of the horse is so securely defended by the yielding resistance of the temporal muscle, that fracture rarely occurs, except at the occipital ridge; and the depression of bone is there so considerable, as to produce complete coma, and bid defiance to all surgical skill.

Hydatids in the Brain.—Symptoms.—One of our patients affords us too frequent instances of the effect of chronic compression of the cerebral substance. After a severe winter, and a cold and wet spring, many of the yearling lambs, and particularly those that are weakly, exhibit very peculiar symptoms of disease. The malady usually appears during the first year of the animal's life, and when it is about or under six months old; it is far less frequent during the second year, and after that the sheep seem to have acquired an immunity against the attack of the hydatid. The symptoms are as follows:—the sheep cease to gambol with their companions; they are dull; they scarcely graze; they ruminate in the most languid and listless manner; they separate themselves from the rest of the flock; walk in a peculiar, staggering, vacillating manner; lose themselves; or seeking out some ditch or brook, they stand poring over the ruffled or flowing water. They stand there until they appear to be overcome with vertigo, and often tumble in. In the midst of their grazing they suddenly stop, look around frightened, and start away and gallop round the field. They begin to lose flesh, and the countenance is haggard, and the eye wandering, and of a curious bluish colour. The last circumstance, although not observed so carefully as it ought to be, is perfectly characteristic of the disease; and a clever shepherd would select every sturdied sheep from the flock by the colour of his eyes.

Decided Affection of the Brain.—This evident cerebral affection increases. The animals begin to carry the head on one side, and always on the same side. It is with difficulty that they can straighten the neck in order to graze, and then there is a peculiar undecided motion in the act of grazing. Their fits of wandering become more frequent; they are oftener frightened without apparent cause; they take increasing pleasure in poring over the rippling brook; there is something in the playing of the light on the water, or in the murmuring sound, which has a lulling influence over them, and they oftener forget themselves and topple in and are drowned.

Peculiar Rotatory Motion.—By-and-by they commence, and even while grazing, a rotatory motion, and always in one way, and with the head turned on the same side. Then they almost cease to eat or to ruminate, partly because the disease, from its debilitating character, destroys the appetite altogether, and more perhaps because they are rapidly becoming blind. They begin to be inattentive to surrounding objects, and move among them as if they were unconscious of their existence. The habit of turning round increases; they will continue to form these concentric circles for hours together without stopping, or until they fall, and they will rise again only to commence the same round: at length they die emaciated or exhausted; or death is somewhat hastened by their being unable to extricate themselves from the brook or the ditch.

Proceeding from an Hydatid.—On examining them after death, we find an hydatid; a true hydatid between the pia mater and the brain, and sometimes embedded in the cerebral substance. The existence of these hydatids has been doubted in the human brain. After enumerating various names, on the one side and the other, Dr. Copland, in his article on the Brain, in his excellent "Dictionary of Practical Medicine," says, that 'whether these bodies were entozoa, or mere hygromalous tumours or cysts, rests upon the pathological reputation of the physicians.'

Description of the Hydatid.—There is, however, no doubt about the matter here; they are hydatids of the *cysticercus tenuicollis* species (the hydra hydratula of Linnæus). When they are perfectly dissected out, the neck is readily perceived, and the tentacula, or barbs, projecting from the apparent opening or mouth, which forms the extremity of it. They vary in size from a marble to a pigeon's egg. A cyst or bladder presents itself, containing a fluid, sometimes a little turbid, and at other times as pellucid as water, but with a slight animal taste and smell. There is no further organisation about them than that they appear to have a double or treble investment, the centre layer of which would seem to be of a muscular character. Sir Everard Home

says, that after having submitted them to examination with microscopical glasses of a high magnifying power, 'their coats resembled paper made upon a wire frame, that is to say, the muscular fibres interlaced each other in a way that would satisfactorily account for their vibratory motion.' The parasite, when first extracted and placed in warm water, has an evident vibratory motion, and if then punctured, the contained fluid will be ejected to a considerable distance. The inner membrane is clearly marked with rugæ, like the stomachs of animals of a different class.

Mode of Production.—Their mode of production is altogether unknown. The ovum or germ, or minute hydatid, may be floating in the atmosphere, or be received with the food, and like some other entozoa, and more particularly like the filaria in the eye of the horse and the ox, may thread the various bloodvessels and capillaries until it arrives at its destined nidus, the brain of a weakly sheep; or, under certain conditions of the brain, are these entozoa produced spontaneously? and if so, what are the laws and the conditions of their production? Has a state of debility any influence on the production of these parasites? or why should their appearance be confined to the very youth of the animal? Of these things I know nothing—they are mysteries which I am unable to penetrate; but the mode of reproduction in the hydatid I know, and it is singular enough. Smaller hydatids are found floating in the belly, if we may so term it, of the larger ones. Many dozens of them have occasionally escaped when the parent has been wounded, and on the rugous surface of the envelope of the hydatid, and particularly towards the region of the neck, there are numerous minute granules or vesicles, which are probably the germ of future hydatids, while on the outer coat of the hydatid there are certain irregularities, little points or granulated projections, by means of which the hydatid seems to be united to the cerebral substance.

Progress of the Disease.—These parasitical animals are probably exceedingly small when first deposited in the brain, and whether their growth is slow or rapid, they at first produce little disturbance there; no altered function will tell of their presence; but when they have attained a considerable bulk and press upon the neighbouring vessels, or the origins of the cerebral nerves, their presence cannot be mistaken.

If the head should sometimes be held on one side and sometimes on the other, it indicates that there is an hydatid in each lobe of the brain. In a very few cases the sheep will march straight forward, with his head depressed, running against everything in his way, and continually falling: the hydatid will then be found to be attached to the corpus callosum, and to occupy the middle sciasure of the brain. In a few cases the muzzle will be elevated, and the head thrown back, and still the sheep will pursue his straightforward course; the hydatid will then be found on the cerebellum, or occupying the fourth ventricle.

Very prevalent.—This is a sadly prevalent and fatal disease in some wet and moorish districts, and in cold and backward springs. It is particularly fatal in the greater part of France. It is supposed that at least 900,000 sheep annually die there of the *tournis* (so the malady is called in France). We give it many strange, yet not all unmeaning, names, the gig, goggles, turnsick, sturdy.

Strange Opinions of its Cause.—Old writers attributed it to various other causes; as, the poisonous effect of certain plants, or the consequence of exposure to hoar frost. Some have considered it as a species of serous apoplexy; others the result of the accumulation of fluids in the ventricles of the brain; and others have traced it to violent blows on the head either inflicted by the brutality of the shepherds or in the playful or serious contests of the animals with each other. Among modern writers, Mr. Price considers it to arise from local weakness of the membranes of the brain, and that from the constant inclination of the head when feeding, distention of the membranes is the consequence: Mr. Hogg, forgetting the anatomy of the brain and spinal chord, believes that it is an excess of fluid injected into the brain from the central canal of the spinal column; and another writer, adopting a similar opinion, has affirmed that it results from the lambs not being docked at a sufficiently early period, for "sometimes the ewe, in the ardour of her maternal affection, chews away the tail from her newly-fallen lamb, and none of these are afterwards affected by the sturdy; whereas where lambs have been docked late, a quantity of water has been found lodged at the root of the tail, which may sometimes increase, and proceed along the spinal marrow, until it makes its final lodgement in the brain. Unfortunately for these gentlemen, there is no communication between the centre of the spinal chord and the brain.

Not hereditary.—Is there no cure for it? Mr. Parkinson thinks he has discovered one, but I much doubt whether you would practise it. He prefaces his account by a remark that is both consolatory and true. "I have cured a great number of sheep, some of which have afterwards bred many lambs, and I never knew an instance of the offspring being so affected. I do not believe that it is an hereditary disease. It

depends upon the season and state of the sheep at the time; and, the strength of the constitution being restored, there is no reason to fear that the malady will be communicated to the offspring.

Cure by Rupture of the Cyst.—Mr. Parkinson tells us, that his father's remedy was to cut off the ears, rather by way of bleeding than with any other intention; and a sheep now and then, perhaps about one in twenty, was thus cured. "It happened one day," says he, "when I was with my father's shepherd, I observed one of the half-year-olds, although not entirely leaving the flock, yet having the appearance of being affected with the disorder. The shepherd was an extraordinary good runner: but this sheep gave him a severe chase, and he was some time in catching it, which put him in a passion; and happening to take it by the ears, he twirled it round several times before I got to him. I then cut off its ears, as near to the head as I could with safety: it being our usual practice to cut them off pretty close; but by swinging it round the shepherd had probably pulled the ears out of the socket, for the result was, that in about two days the sheep had rejoined the flock. Since that occurrence I have made a rule constantly to pull the ears very hard for some time before I cut them off; and this proceeding has seldom failed of effecting a cure." This is far too brutal and barbarous for you and me; although I can easily imagine, that in the dreadful struggle which must ensue in wringing the ears so "very hard," and then cutting them off, the cyst will probably be ruptured, and the hydatid destroyed; but the sheep would stand no little chance of being permanently injured, and I would rather send it to the butcher at once.

Others effect the same object in as brutal a way. They set the dog on the poor sheep, to hunt and worry it without mercy; and the chase is so contrived, that, if possible, the sheep shall tumble down some stone-pit or considerable declivity; and in the shock of the fall the hydatid is burst, although, now and then, the neck of the sheep is broken.

Two cases are gravely related in confirmation of this practice; that a sturdied sheep was frightened by a pack of hounds that came into the field in which it was grazing, and that it immediately leaped over a high hedge, and was afterwards well; and another sheep was standing on the edge of a precipice, and fell down and broke the hydatid, as was supposed, and was ever afterwards free from the disease.

Other Remedies.—Neither Mr. Lawrence's warm-bath, nor the mercurial friction, nor the repeated doses of physic recommended by others, although having a more surgical appearance, could have any effect on a disease like this.

Perforation through the Nose.—Mr. James Hogg, the Ettrick shepherd, used to practise a very ingenious operation. He shall speak for himself:—"When I was a youth, I was engaged for many years in herding a large parcel of lambs, whose bleating brought the whole sturdies of the neighbourhood to them, with which I was everlastingly plagued; but, as I was frequently weaving stockings, I fell upon the following plan: I catched every sturdied sheep that I could lay my hands on, and probed them up through the brain and nostrils with one of my wires; when I beheld, with no small degree of pleasure, that by this simple operation alone I cured many a sheep to different owners; all which projects I kept to myself, having no authority to try my skill on any of them; and it was several years before I failed in any one instance." This is saying a great deal for the operation, which he describes more particularly in another place. "The operator must feel for the part of the skull that is soft, and lay his thumb flat and firm upon that; then, taking the wire in his right hand, he must push it up the nostril that points most directly for the place that is soft, where the disease is seated; and if he feels the point of the wire below his thumb, he may rest assured that the bag is perforated; and that, if the brain does not inflame the creature will grow better. The bladder being thus pierced on the lower side, the liquid continues to drip through the hole as long as any remains, and even as fast as it gathers, so that the perforation does not get leave to grow up or close again until the animal is quite better."

Danger of this Operation.—I have, however, considerable objection to this operation, which has had a fair trial in various parts of the kingdom, and in Scotland particularly; and although it is still practised by some, is far from being so successful as it was in the hands of Mr. Hogg. Considerable mischief is done in the passage up the nose; for the sense of smell in the sheep being very acute, the turbinated and æthmoidal bones are greatly developed, and fill the nostril almost to choking, in order to give greater surface for the pulpy ramifications of the olfactory nerve to be spread upon. Both of the turbinated bones, and the nasal portion of the æthmoid bone, must be perforated. The style must next pass through the cribriform plate of the æthmoid bone; and, from the sudden depression of the parietal bone, and the dip of the cranium downward, the situation of this plate is somewhat changed, and does not present itself, as in the horse or the ox, at the termination of the nasal cavity,

and therefore it is a little difficult to hit. Although I have performed the operation many times on the dead subject, and more than once on the living, this perforation of the cribriform plate was not so easy a matter with me as it seems to have been with Mr. Hogg.

The Danger of Wiring.—Then, although from this downward direction of the cranium there is little danger of wounding the base of the brain, or the origin of any of the nerves, yet I can see a great deal of danger in this perforation of the medullary substance. It is true that the animal feels it not at the time; but the brain is too lavishly supplied with bloodvessels not to render the almost immediate accession of inflammation a matter of apprehension. Mr. Hogg candidly owns that such as die in consequence of wiring are in the greatest agonies, and often groan most piteously. On dissection the brain appears inflamed, and the course of the wire is easily traced: it appears as if a common wheel spindle had passed through it. He also acknowledges that, in a few instances, he has seen the sheep fall down like a creature felled, and expire in the space of two minutes. In addition to all this, there are sometimes two or three of these hydatids in the same brain, and differently situated, so that the wire cannot possibly reach them all. I am afraid that this celebrated operation, and which the name of the Ettrick shepherd for a while rendered popular, must be suffered to sink into comparative disuse and distrust.

The Situation of the Hydatid discovered.—The effect of pressure is not always sufficiently understood in veterinary or human practice. By the constant, but slight pressure, of this bladder, not only is a sufficient portion of the brain absorbed to make room for the growth of the hydatid, but even the bony substance of the roof of the cranium disappears; and therefore, in process of time, a soft yielding spot, somewhat variable in its situation, but generally a little anteriorly to the root of the brain, and more towards the centre of the skull, marks the residence of the hydatid.

In this way alone is the precise residence of the hydatid detected; and I must beg leave respectfully to demur to the account of this matter given by a very excellent writer, a Dr. Kerr, in the "Cyclopedia of Practical Medicine," that "their precise situation in this (the cranial) cavity has been frequently discovered by the effects produced on particular nerves, and the action of those parts under their influence; indications which have sometimes led to their extraction, to the perfect relief of the suffering animals." Anatomically speaking, I am at at a loss to conceive how they can, by possibility, influence the function of any of the *cerebral* nerves, so as to guide me to their "precise situation," or how I should be able to reach them there. No partial—and it would only be a partial—impairment of smelling, vision, or hearing, or of the motion of the muscles of the eye, could be recognised by me; but it is only by the uncertainty of gait and the growing stupidity, that I recognise the injurious action of some foreign body on the sensitive and the motor columns generally, or the prolongation of them within the cranial cavity. It is a sense of uneasiness or pain, or a feeling of weight, that inclines the animal to relieve himself by leaning the head on one side, and thus pointing out to us the lobe in which the parasite is lodged. The circular motion, naturally tending to that side from this inclination of the head, confirms this indication: but it is the softening of the skull which alone enables us to determine in what part of the lobe we are to seek for the author of the mischief. And now another kind of operation can be performed, to get rid of this little but formidable being.

The Operation of extracting the Hydatid.—A crucial incision should be made over the spot. If a portion of bone remains, it should be removed by the trephine; or if the bone is quite gone, a second incision should be made with the knife through the pericranium and the membranes of the brain. It will be a matter of some importance, and more interest, to extract the hydatid whole, but that will not often be practicable. Every portion of it, however, must be carefully removed: the head of the sheep must be so held that all the fluid may escape; and then the membranes and the integument must be restored to their situation, and a soft pledget, or what is better, an adhesive plaster, put over the whole.

The Appearance of the Cranial Cavity.—Mr. Stephens, at one of the meetings of the London Medical Society in 1831, gave the following account of an operation on a sturdied sheep. He took out a portion of bone with the trephine; and, on cutting through the dura mater, a very large hydatid partially protruded. This he attempted to extract, but the cyst broke. He afterwards extracted the cyst; and, on looking through the opening made with the trephine, he found the interior to present a large empty cavity, and the brain appeared completely gone. He then let down a light into the opening—into the very cavity of the skull, by which it appeared that nearly the whole of the cerebrum was wanting. The opening being afterwards closed, the sheep got up and fed, and seemed better for the three following days; but on the morning of the fourth day he found it convulsed, and in that state it soon died.

External Puncture.—Some, afraid of the large opening into the cranium caused by the trephine, have contented themselves with puncturing the cyst at the spot at which the skull is softened. A common awl is used for this purpose. The fluid usually spirts out violently at first; but there is no certainty of its being all discharged, or of the hydatid being destroyed, by this simple puncture. I do not see that anything is gained by this mode of going to work, for there is no danger in the mere operation with the trephine; the danger arises from causes common to both—the new cavity formed, and the admission of atmospheric air; while there is the advantage attending the trephine of destroying the cyst, and perhaps detecting others in contact with it.

Cautery.—Some have recommended a heated iron as the instrument for effecting the perforation; but this is a relic of farriers' barbarity, and is objectionable from its tendency to produce or to increase that inflammation which is too apt to arise however we operate.

Injections.—When the hydatid has not been completely removed, it has been proposed to inject certain fluids into the cavity to ensure the destruction of the animalcule. Tincture of myrrh has been used. An injection, composed of unknown ingredients, was sold at a great price in France; but it was soon found that inflammation was the almost inevitable result of this practice, and that death speedily succeeded.

Comparison between the Operations.—The operation by the trephine has usually been an unsuccessful one, and more so on the continent than in our country. It has been imagined that two out of five may, at the most, have been saved by this operation, conducted by a skilful practitioner. But he had much to contend with: the enormous vacuum in the cranium suddenly formed by the removal of the hydatid, and the cerebral disturbance which must be the necessary result of this;—the rush of blood which would follow when the vessels, relieved from the compression of the brain, were rapidly dilated;—the admission of the atmospheric air into such a cavity, and the irritation it must inevitably occasion;—the previous impairment of nervous power, both animal and organic, by the destruction of so great a portion of the cerebral substance, and the almost total suspension of the most important of the nervous functions. There is something, then, quite as formidable in the concomitants of the operation with the trephine, as in that of the wire, as practised by Mr. Hogg: and there might be thought to be this advantage on the side of the latter, that the fluid is more slowly evacuated—drop by drop, that the surrounding parts have a somewhat better chance of adapting themselves to the change, and that there is not so free an opening for the atmospheric air.

Both deferred too late.—The efficacy of both of them is probably diminished, and that to a very material degree, by their being employed at too advanced a period of the disease. When the skull begins to soften, sad ravages must have been committed in the cranial cavity. Before the solid roof will yield, a considerable portion of the brain must have disappeared and the chance of saving the animal will have very materially diminished. It is not necessary to wait so long in order to ascertain the existence of the hydatid, for the separation of the sheep from its fellows, its peculiar gait and manner, and the evident impairment of intellect, will plainly mark him out as a sturdy: and then, if he is carefully watched, it will soon be seen on which side his head seems to incline; and on that side the hydatid is lodged. It probably will not then have attained any great size. Either operation may then be resorted to with far better probability of success. I should prefer the trephine—comparatively little danger attends the application of it, if the brain is not previously too much disorganized; and the examination of the heads of several sturdies tells me, that the residence of the hydatid is generally in one particular spot, a little more than an inch anterior to the root of the horn, and in a direction towards the frontal suture. If I am disappointed in finding the parasite there, I can afterwards have recourse to the wire on the supposition that the hydatid may be embedded in the substance of the brain. Under these circumstances, the trephine would succeed much oftener than it does now.

The permanent Result of the Operation.—But there is still another question to be taken into consideration. Supposing that we have effected a seeming cure, can we depend upon the permanent result of the operation? It is mortifying to be compelled to answer this in the negative. It is exceedingly annoying to the experienced practitioner to be constrained to regard his most successful cases with suspicion. The farmer acts properly here—experience has taught him wisdom. He fattens the sheep as speedily as he can and sells him, for in too great a proportion of cases, three months will scarcely pass before the disease will return, and a second operation will become necessary: and even that may not be effectual. No sooner has one hydatid been removed than another begins to develop itself. Huzard jun. counted no fewer than thirty distinct hydatids in the brain of a lamb; and therefore we may sometimes operate without end, and the animal must at length inevitably

perish. Even after the expiration of six or nine months he is not safe.

Difference between the Symptoms of Sturdy, and other cerebral Diseases.—The presence of the hydatid can scarcely be confounded with inflammation of the brain, when we regard the anxious yet half-vacant countenance—the absence of furious delirium, and of all desire to do mischief. If the sheep seems to be galloping wildly about, it is evidently to avoid some imaginary evil, and not to seek an encounter with an imaginary foe. From rabies it will also be distinguished by nearly the same symptoms; but more of the distinguishing symptoms between the sturdy and frenzy and rabies hereafter.

With apoplexy and inflammatory fever, it can scarcely be confounded, for these generally attack the flower of the flock: the comparatively debilitated sheep is the prey of the hydatid. The victim of the former can scarcely be induced to move, the latter is scampering everywhere without rhyme or reason. The progress of apoplexy and inflammatory fever is rapid—a few hours decide the fate of the patient; the progress of this is slow: the one dies of plethora, the other of marasmus.

Medical Treatment.—Are then our efforts confined to the one or the other of these operations, and the tedious waiting for the time when we may have recourse to them, and the doubtful result to be expected from them?—nearly or quite so: but then the farmer may do something, he may do much more than he imagines, *in the way of prevention*. He should take much better care of his lambs in the winter. I have known a few cold nights have an effect in the flock that could not be completely got rid of for many weeks. Rheumatism, and coryza, and scouring, and ultimately the hydatid, severely and justly punish the farmer for his neglect and cruelty to his young charge in the winter. I am no advocate for that system of nursing which would render the flock unable to endure the sudden changes of our variable climate, but there is a recklessness about our farmers with regard to their ewes and lambs at yeaning-time, which cannot be too sternly reprobated, and for which they justly suffer. The winter and early months of spring being passed, the disease almost disappears.

M. Giron de Buzaseinques, in a paper on this disease, read before the Royal and Central Societies of Agriculture in 1824, thus expresses himself: "I have put into practice my mode of prevention—I have fed my flock better and given them more exercise. I have driven them on the mountains of Aveyron, where the salubrity of the air and the diversity of the herbage invite them to stray about to cull the sweetest food. I have spread salt about, and by such regimen I have strengthened my sheep, and the consequence has been that I have had less staggers among them; the malady is on its gradual decline, and I reckon by perseverance to get completely rid of it."

Supposed Prevention.—Some proprietors of sheep have endeavoured to protect the cranial cavity from the debilitating influence of cold and wet, by leaving the head covered with the wool until the lambs were eighteen months old, but the hydatid was as mischievous among the flock as before. A decoction of madder root has been given to whole flocks without beneficial result. Some have bled every sheep in the flock when the sturdy began to appear, but its ravages were not staid. Others severely blistered the whole of the roof of the skull, and with the same want of success. A German writer believed that the unknown parent of the hydatid, pierced the skull on some part of the forehead and deposited its eggs, and therefore he covered the whole of the skull with a glutinous impervious substance, composed principally of the white of eggs: not a sheep the less was attacked, although the seat of the disease was protected by this impenetrable covering.

Nairac's Preventive Treatment.—The most recent preventive and curative, was that promulgated by Nairac, and of which Hurtrel D'Arboval gives a long account in his valuable essay on *Le Tournis*. It consists in the application of the actual cautery to the skull. A kind of branding iron was made, to one end of which an N was fancifully affixed. The wool was cut off from the forehead, and the iron being heated so that resting on a card for two seconds it would carbonise but not perforate it, it was placed somewhat lightly on the forehead of the lamb. After resting there two seconds it was lifted up, and immediately replaced with a greater pressure for three seconds; it was once more moved, and again pressed yet more firmly on the skull for five seconds. All the lambs of four and five months old underwent this severe cauterization, and which was effected before the summer came on, or the flies could be likely to deposit their eggs in the wound. The place selected for the cauterization was over the frontal sinuses and between the eyes. This was the preventive treatment, and according to Nairac it was infallible. He operated on many thousands of lambs, belonging to himself and others, and did not lose one. He continued his experiments during fifteen years without a single failure. This was even more satisfactory than the knitting-needle of the Ettrick shepherd. It was, however, nothing more than a severe branding of the lamb on the forehead with the magical ceremony of removing the iron so many times, and replacing it with regularly

increasing pressure, and a cabalistic increasing number of seconds.

It fails when put to the test.—Some persons, however, began to doubt whether this branding on the forehead, severe as it was, could destroy the diminutive hydatid, which might have existence, but was yet incapable of doing mischief; and still more did they doubt whether the permanent effect which Nairac described could possibly be procured, and they determined to put its boasted preventive power to the test. Hurtrel D'Arboval entered the field among the rest, and he was enabled to experiment on a somewhat large scale. He had a flock of 174 Merino lambs, and none of them a twelvemonth old—he applied the cautery to ninety-three of them, and he left the remaining eighty-one to take their chance. Out of the ninety-three no fewer than eight became sturdied and died, and only four of the eighty-one were affected. Hurtrel D'Arboval, with his usual candour, acknowledges that he would not be justified in concluding from this single experiment, that the cauterization predisposed the animal to the production and growth of the hydatid; but he was fully warranted in concluding that the cauterization had no preventive effect at all.

Another empiric now appeared in the field.—The branding-iron was again used in the same manner, but applied immediately over the situation occupied by the hydatid, and on two or three other places on the cranium, so as to produce considerable sloughing and discharge. This was soon put to the test, and the immediate result was as satisfactory as could be desired. Four sheep were cauterised and seemed to be perfectly cured, and they continued apparently well during four months, when the disease returned and they died. This mode of treatment therefore rapidly lost the reputation which it had acquired, and fell into comparative disuse.

I have dwelt thus long on this disease, because it is a sadly fatal one, and you should be acquainted with everything that has been done or can be done respecting it; and as often as you have opportunity I trust that you will enter on a course of experiments that may by possibility lead you to some successful result: but in the present state of our knowledge and practice, I am afraid that, regarding the interest of your employers, you should advise them when the turnsick begins to appear among the lambs, to fatten them as quickly as they can, and to slaughter those that may become affected the moment the disease is ascertained. This is a most lame and impotent conclusion. I am sorry for it; but truth must be our guide.

Lecture XLV.

TURNSICK OR COMPRESSION ON THE BRAIN IN THE OX.—HYDATIDS IN THE BRAIN OF THE OX.—TURNSICK IN THE DOG.—HYDROCEPHALUS IN THE HORSE AND OX.—EFFUSION IN THE VENTRICLES.—ENLARGEMENT OF THE PLEXUS CHOROIDES.—SANGUINEOUS CONGESTION IN THE BRAIN.—MEGRIMS.

The act of turning round and round, and always in one direction, is not confined to the sheep. Some rare instances of it have occurred in cattle practice, accompanied by the same impairment of sense and consciousness of which I spoke in the last lecture as existing in the sheep, and evidently the consequence of partial compression of the brain. A case of it fell under my observation in 1829.

Turnsick in a Cow.—The milk of a cow suddenly decreased in quantity, she scarcely ate, rumination was suspended, the muzzle was dry, the mouth hot, the hair rough, and the roots of the horns hot: the breathing was laborious, the flanks tucked up, and mucus mingled with the dung. There was fever without any local determination immediately evident. She was bled and setoned, and put on a mash diet. When I called to see her on the following day, I was told that "there was something very strange the matter with her, for that she was running round and round until she became giddy and could hardly stand." They had placed her in the cowhouse and fastened her up. I ordered her to be brought out. There was a peculiar staggering in her walk, and her vision was evidently impaired, the head was projected, yet held a little on one side, and she was no sooner set at liberty than she began to describe circle after circle. I saw nothing of the giddiness which had been described to me, but she made me giddy by looking at her.

Difficulties of the case.—It was a new case to me. I thought that I had found what I had occasionally heard of, a true case of hydatid in the brain of horned cattle. I pondered for a while what to do. Nothing could indicate to me the situation of the hydatid, farther than the holding of the head in a uniform direction from left to right in which she pursued her course. Supposing that the inner plate of the cranium might become softened, the frontal sinuses were interposed from the nasal bone to the foramen magnum, and the external plate would remain sound. Had she been in somewhat better plight, I am afraid that I should have at once consigned her to the butcher.

I then reflected, that although these symptoms, this holding of the head on one side, and this circular motion, were the effect of pressure on a particular part of the brain,

and in the sheep were produced by an hydatid; yet that effusion between the membranes spreading over only a small surface or the rupture of some small vessel might produce the same effect, and might possibly be doing so here. I determined therefore to give her a chance, and I bled her again freely, and from the left jugular, as the mischief, whatever it was, seemed to be on the left side, and I gave her another and a stronger dose of physic, and I had the pleasure of seeing her considerably relieved, and in less than a week she was perfectly well.

French accounts of the same affection.—A twelvemonth afterwards I had the pleasure to meet with a report of four cases of a similar kind in the Recueil de Médécine Vétérinaire, by Professor Gellé, of Toulouse. The symptoms suddenly appeared; the appetite was diminished; rumination ceased; the feces were voided in small quantities and hard; the urine was thick, and the mouth was hot. The animal turned frequently, and constantly in one direction, and while he was turning he endeavoured to crop a few blades of grass. The conjunctiva was injected and red; a mucous discharge flowed plentifully from the nose; and the pulse was accelerated and hard. The horns and ears were hot; the hide adherent; and there was great tenderness over the region of the loins. M. Gellé considered it to be a slight cerebral inflammation; he bled, administered mucilaginous drinks, with Glauber's salts, and put the animals on spare diet, and in the course of four or five days the beasts were perfectly recovered.

You will not therefore consider this turning as necessarily indicating the existence of an hydatid in the brain of cattle; but will rather attribute it to some temporary and local effusion or pressure, which bleeding and physicking and starvation may possibly remove.

Hydatids have been found in the Brains of Cattle.—Cases, however, have occurred in which a disease marked by this peculiarity of turning, has actually been produced by the existence of hydatids in the brain of cattle. Bartholin relates, that in 1661 a great many beasts perished from a species of frenzy, and that when they were examined, *vesicular worms* were found in the substance of the brain.

Curious Application of Percussion.—Wepfer speaks of an operation for the turnsick which he saw performed on some Swiss cattle. When this circular walk was observed, the beast was caught, and was struck with a hammer about the head and behind the horns; and the operator judged by the shrinking of the animal, where there was any vacuum, and there he made an opening into the skull. This certainly does not coincide with the anatomy of the present day. We have seen that between the two plates of the cranium, there is a continuous hollow from the nasal bone almost to the tip of the horn, and again posteriorly to the very edge of the foramen magnum. We too should have suspected disease where the animal shrunk from the blow; but we should have predicated a collection of matter there, from inflammation of the lining membrane of the frontal sinus, and, by some adventitious texture, confined to a particular spot. I have spoken of this when describing the frontal sinuses, and inflammation of their lining membrane. Beneath the inner plate of the skull there is no vacuum as here described, but a watery cyst occupies the situation of the pulpy matter of the brain. How this was to influence the feeling demonstrated by percussion, I am yet to learn.

The Existence of the Hydatid may be ascertained in young Beasts by the Softening of the Skull at the Root of the Horn.—Wepfer very properly remarks, that the frontal sinuses are not fully developed in young beasts, and that the situation of the hydatid may frequently be detected in them, in the same manner as in sheep by the softening of the cranial roof at some particular spot. This indeed would be decisive: but he speaks of an operation which he performed where he had not this guide, and depended on the pain caused by percussion, for he operated below the horn, and on the parietal bone, and through a mass of muscles, and he operated successfully.

Further Proofs of Hydatids in the Brain of Cattle.—The writer of a paper read before the Medical Society of Toulouse, describes a person who had operated on cattle twelve times for the extraction of the hydatid, and eight times out of the twelve with perfect success; and the same gentleman exhibited to the society two hydatids which he had extracted from the brain of a heifer eighteen months old. Our records, disgracefully scanty, confined in a manner to a periodical not six years old, contain no history of turnsick in cattle; but I have seen, as I have already mentioned, one case of it; I have heard of others; and from the very frequent success which has attended prompt and decisive practice, I am disposed to attribute it to partial compression of the brain from some other cause.

Turnsick in the Dog.—I turn, however, to another of our patients, and there I have more frequent illustration of the effect of this partial pressure. A dog is listless, dull, and off his food, for two or three days; then an apparent stupidity creeps upon him; he scarcely recognises any surrounding object; he has no fit, but he commences this round-about way of rambling. He forms compa-

ratively larger circles than the ox; the area of the room alone bounds his wanderings, and often, for hours together, he will describe these circles, and always the same direction, and generally with his head on one side. At first he will carefully avoid every obstacle in his way, but by degrees his sense of vision becomes lost, and his mental faculties impaired, and then he blunders against everything.

This complaint uniformly fatal.—I have resorted to every remedial measure which the case could suggest. I have bled, and physicked, and setoned, and blistered, and used the moxa, but all without avail, for in not a single case have I been successful. You may suppose that I have lost no opportunity of post-mortem examination. In some cases I have found spiculæ projecting from the inner plate of the skull, and pressing upon, and even penetrating, the dura-mater. I know not why the dog should be more subject to these irregularities of cranial surface than any of our other patients, but decidedly he is so; and where these irregularities have pressed, there has always been injection of the membranes, and sometimes effusion between them. At other times I have found effusion without this external pressure, occasionally distention of the lateral ventricles by serous fluid; and, in some cases, but comparatively few, there has not been any perceptible lesion; in no instance, however, have I met with an hydatid or anything that could possibly be mistaken for one.

Singular instance of compression on the brain of the horse.—There is no well-authenticated account of the existence of an hydatid in the cranial cavity of the horse; but cysts containing a fluid, sometimes serous and pellucid, at other times of a yellow colour and a viscid character, have occasionally been found, and they have produced many of the symptoms that I have just described. The most satisfactory one that I know is recorded in the *Journal Théorique et Pratique* for July, in the last year. It is recorded by M. Leloir. A horse was wounded by a bullet in the superior part of the shoulder, six inches below the withers. He was taken to the infirmary at Alfort and cured, but in the spring of 1815, 1816, and 1817, there appeared a little below the cicatrix a small tumour which suppurated, burst, and healed of its own accord. In April 1818, however, instead of the tumour, the horse exhibited symptoms of intense vertigo, which disappeared in eight days after copious bleeding and purgatives, and the local application of cold. In April 1819, he was again attacked with vertigo, and exhibited the following symptoms:—he carried his head low, and always inclined to the right side; he staggered as he walked, and the motion of his limbs was marked by a peculiar convulsive action, confined, however, to the fore extremities; he moved by a succession of spasmodic boundings; he was completely deaf, and rapidly lost flesh, although he ate and drank voraciously.

He remained in this state until the month of November, when all these symptoms, except the deafness, sensibly diminished; and so he continued until the 3rd of January 1820, when he experienced a fresh attack of vertigo, and died suddenly. On examination after death, the following lesions presented themselves. The dura-mater and arachnoid membrane were red over the whole of the superior and anterior portion of the brain. On the *septum médium* (corpus callosum, properly, septum lucidum), and towards the posterior part of it, was a round cyst fixed between the two cerebral lobes. It was about the size of a pullet's egg; its parietes were thickened, and of a fibrous character, and it contained a homogeneous, yellow, viscid fluid. It adhered by its anterior portion to the septum medium, or corpus callosum, and by its superior part to the ridge of the parietal bone; and it was attached to both by dense and compact tissue. The ventricles were filled with serous fluid, and the plexus choroides were injected and of a violet colour.

Turnsick in the Human Being.—I have heard of affections of the brain in the human being, in which there has been a peculiar uncertainty of gait and tendency to this circular motion, and in which, when the patient sat up, he described with his head, yet very imperfectly, these rotatory movements, and always the same way, and with the head permanently inclined to one side. I have understood that this has been attributed to partial local pressure on the brain, but I never heard but of one case in which the hydatid was the apparent cause of these singular phenomena. I am, however, far too ignorant on this subject as it regards my own patients, to be warranted in hazarding a conjecture with regard to any similar malady in the biped.

Hydrocephalus. — *Congenital.* — Another cause of compression of the brain is the presence of an unnatural quantity of fluid either between the arachnoid membrane and the dura-mater, or beneath the arachnoid, or in the ventricles. It is oftenest congenital, and in the calf much more frequent than in the foal. In congenital hydrocephalus, the fluid is usually between the membranes, and it exists in so great a quantity, and enlarges the cranium to such a degree, that parturition is difficult, and it is usually necessary to destroy the progeny in order to save the mother. M. Taiche relates a case in the *Journal Pratique* in which

a calf was born with an enormous tumour on the anterior and inferior portion of the frontal bone. The young animal was weak, and it staggered as it walked, but it sucked heartily when held to the teat, and its head supported. The tumour evidently contained a fluid. M. Taiche punctured it, and two pints and a half of limpid fluid escaped. After the operation, the calf walked of its own accord to its mother, held up its head for the first time, and sucked its fill. During the three first days it seemed to be doing well; but then a bloody pus began to flow from the wound, and on the seventh day a very unpleasant smell proceeded from it; the animal refused to suck, lay with its head extended, and breathed with difficulty. On the following day tetanus supervened, and the poor beast was destroyed. The left side of the cranial cavity was considerably larger than the right, the walls of the cranium on that side seemed to have been long and forcibly compressed; two thirds of the anterior wall of the lateral ventricles had disappeared, but the rest of the brain was well formed and sound. Here is the cranium of a calf that was born with water in the head. It died on the second day; there is no distinct and separate enlargement, but the whole of the cranium seems to be forced outward and with strange deformity. This, however, is a very rare disease.

Hydrocephalus, if not congenital, seldom attacks the young animal.—I never saw a case in which water in the head accumulated in a young animal that was born healthy, nor do I believe that there is one upon record. This is very singular, considering how many infants and children fall victims to this disease. It is a circumstance for which I am unable to account, except the different state of the skull in the infant and the quadruped should be admitted to exert considerable influence on the progress, if not the origin, of the disease. In the infant none of the bones of the skull are perfectly formed. In some of them the process of ossification has scarcely commenced. Few or none of the sutures are closed, and the fontanel or chasm at the meeting of the coronal and sagittal sutures long continues open. If, from certain causes, inflammation should be established in any part of the brain or its membranes, and the effusion from the exhalent vessels consequent on this should commence, the cavity of the cranium readily enlarges as the fluid pours out, and offers little resistance to its accumulation. In the quadruped, however, exposed to dangers from which the helplessness of the infant exempts him, the brain has a firmer covering, the process of ossification is much farther advanced; the sutures have closed; the fontanel never had existence, or is obliterated; the cranial cavity is incapable of enlargement, and when the process of effusion commences, that pressure on the exhalent vessels takes place, which is the most effectual restraint on their inordinate action.

Some medical practitioners have resorted to compression in chronic hydrocephalus, and they have imagined with advantage; but the grand difficulty has consisted in rendering that pressure perfectly equable; and being enabled to apply it before the habit of effusion was established, and when alone it could be arrested with safety or arrested at all. Nature has here contrived a uniform and seemingly effectual resistance to the accumulation of the fluid.

The diminished size of the brain itself in the quadruped, and notwithstanding this, the preponderance of that part, the medullary substance, which although it may suffer from the pressure, is little concerned in the production of the fluid; and the lack of the cortical or cineritious portion, in or about which the effusion takes place, these things may have effect in preventing in the quadruped a disease so fatal in the human being.

Accumulation of Fluid in the Ventricles.—In the adult animal, however, whether horse or ox, the effects of compression of the brain from effusion of fluid in the lateral ventricles occasionally come under our notice. This resembles, and sometimes very closely corresponds with, serous apoplexy in the human being. I know not the symptoms which during the life of the animal are to guide us in distinguishing between serous and sanguineous apoplexy, (which is presently to be described,) except perhaps that in serous apoplexy the progress of the disease is slower, and the symptoms are of a milder character.

Case of Serous Apoplexy.—Observe these enormous plexus choroides. They are quite as large as an almond with the shell upon it. This belonged to a horse that died of serous apoplexy. From a high-spirited, free-working animal, he had gradually become a mere slug; and he had more than once stood suddenly still while on a journey, as if threatened with an attack of megrims; but he had never fallen or been decidedly convulsed. He had likewise very rapidly been losing condition. He was found one morning with his head leaning against the manger, and supporting the greater part of his weight. He was unconscious of surrounding objects heard not when spoken to, and there was no winking when the hand was moved immediately before his eyes, the pupils of which were dilated. The pulse was scarcely perceptible but much quickened. On being moved backward from the manger he fell, but immediately scrambled

up again, and stood staggering and balancing himself. The respiration was laborious, the schneiderian membrane intensely red, and a frothy fluid dropped from the mouth. He was bled until he began to blow, and a dose of physic was administered. Consciousness was partly restored, but he still persisted in leaning against the manger, and refused all food. A servant was desired to sit up with him, but he deserted his post, and the horse was found dead early on the following morning.

Post-mortem Examination.—There was not the slightest trace of inflammation in any part of the brain, but the lateral ventricles were filled with a yellow serous fluid, to the amount of at least six ounces, and in which the plexus choroides seemed to be raised from their beds and to swim. The arch of the fornix was evidently elevated, making, as it were, one continuous ventricle of the two; and the fourth ventricle was fully as much distended as the lateral ones. The lungs were congested with blood, and traces of inflammation appeared through the whole of the intestinal canal. Here are enlarged plexus choroides, which were found in the brain of another horse that came into my hands for the purposes of dissection. Of the history of the disease I knew nothing. The plexus choroides are even more enlarged, and the fluid of a serous character was as abundant. I suspect that serous apoplexy is no unfrequent disease in overworked and half-starved horses; but our post-mortem examinations have usually been too carelessly and superficially conducted: very rarely are they extended beyond the few minutes that a trifling bribe will delay the departure of the knacker's cart. We sadly need reformation here.

Enlargement and pressure of the plexus choroides not always injurious.—I perfectly recollect two cases during my attendance at the veterinary college, and my yet more diligent attendance at the knacker's yard—(the latter, Gentlemen, is a place which I trust you will never frequent for the diabolical purpose of torturing a poor condemned and miserable animal, but where you may occasionally gain a clearer insight into the nature and progress of disease than the lectures of the most talented instructor can afford you). There were two horses that had exhibited no apparent cerebral affection, yet in whom the plexus choroides were even larger than in the specimens before you. In one horse in particular they were as large as pullet's eggs; but they were rather sarcomatous tumours attached to the plexus, than an actual conglutination and enlargement of that congeries of vessels. The larger portion lay on the corpora striata, and flattened them and left their impression upon them, but there was no collection of fluid in the ventricle. Professor Rodet relates a case in which the tumours completely occupied and filled the ventricles, and also pressed chiefly on the corpora striata, and produced a softening of the cerebral substance; there was, however, no nervous affection or impairment of intellect. The main pressure, however, in these cases, was on the anterior portion of the base of the brain; and it would have been a point of interest to have ascertained whether the sense of smelling was affected. In effusion of fluid into the ventricles, the pressure is over the greater part of the base of the brain; and, owing to the communication between these cavities, reaches even to the medulla oblongata; and hence, probably, the stupidity and loss of voluntary power which I have described.

Determination of blood to the brain.—There has been some dispute among human pathologists as to the compressibility of the cerebral substance. It has been supposed accurately to fill the cranial box, so that there can never be any material variation in the quantity of blood in the brain. The incompressibility of the cerebral mass I may not be disposed to dispute; but the perfect occupancy of the cranial cavity I am much inclined to doubt. The elastic cellular substance about all the bloodvessels, and within and about the sheaths of all the nerves, and the base of the brain generally, cannot be mistaken, and may be compressible to a very considerable extent. I can see the utility and the necessity of this, when I recollect the great quantity of blood which permeates the brain in a state of health, and which is so liable to be increased by many accidental circumstances. The structure of the longitudinal sinus, and the bands by which it is connected with the pia-mater, force on me the probability, or rather the actual existence, of occasional dilatation and contraction; and the cellular substance about the rete-mirabile was placed there, by its yielding resistance to guard these important vessels. While, therefore, I could account for all the symptoms of apoplexy on the principle of the supposed incompressibility of the brain,—while I could imagine that the presence of a little more blood in the arterial vessels would render the venous ones impervious; or the loitering of the blood in the veins would close the arterial vessels, and thus prevent the circulation of the blood through the brain, or produce injurious pressure on the nervous origins; (or the rupture of a vessel and the extravasation of but a small portion of blood would be followed by very serious effects;) yet the inspection of various brains of horses that have died of staggers, or phrenitis, has forced on me the fact, that a considerably greater quantity of blood is sometimes

found in the cranial cavity than at other times; and therefore the next class of diseases which I shall notice will necessarily fall under the head of

CONGESTION OF BLOOD IN THE BRAIN.

Not necessarily connected with inflammation.—If I ride a plethoric horse far and fast, and especially on a warm day, I shall probably have congestion of the lungs without inflammation of those organs. They, and the respiratory apparatus generally, are over-worked in supplying the arterial blood which this excessive and unusual muscular exertion requires; and at length become so exhausted that they can no longer contract on the blood which they contain. *The horse is blown.* Give a little time for rest and reaction; hasten that reaction by proper stimulants, and they gradually relieve themselves of the load which oppressed them; but, hurry the animal after he has exhibited symptoms of distress, or complete the exhaustion by immediate and unskilful bleeding, and he dies, and affords you a specimen, pregnant with instruction, of most extensive congestion, independent of inflammation. So, occasionally, when we ride a fat and pursive horse a little beyond his usual speed, he evinces temporary distress clearly not referable to the respiratory system,—he suddenly staggers, and threatens to fall. We have caused the blood to flow with greatly increased velocity through the lungs in order that the requisite supply of arterial fluid should be furnished; and if through the lungs, likewise through every other part of the frame, and the brain among the rest. The arteries supply it more rapidly than the veins can carry it off; the distention of the arteries perhaps causes compression of the veins; and hence the circulation is impeded, and there is greater or less pressure on the origins of the nerves.

Megrims in the Horse.—I add to this another cause of congestion of blood in the brain. I am *driving* my horse: the collar is probably a little too tight,—it presses on the jugular vein, and prevents the free return of the blood from the head. What is often the consequence of this? Why, the animal begins to go a little sluggishly: I perhaps take no notice of this, or, not attributing it to its proper cause, urge him to his former speed. Presently afterwards he stops—stops sometimes as if he were shot, staggers, is deaf to my voice, and scarcely conscious of surrounding objects; he backs a little, the collar ceases to press upon his neck, and he recovers; he shakes his head, looks a little frightened, and goes on again, but with not quite so much spirit as before. This attack is strangely called the *megrims.*

A more aggravated case.—Often, however, the matter does not end here. He begins to be unmanageable,—he takes a sudden fancy to go round and round, and then he staggers and falls; or he falls at once; and then, according to the degree of congestion, or the relief that he may experience from the removal of the pressure of the collar, or other causes of which I am ignorant, he either lies insensible for a while, or he begins to struggle most violently, or he quickly scrambles up again, frightened at what has happened, and afraid of my correction; and he goes on as if nothing had happened, except that he is dull and languid. The cases are not unfrequent, and especially in sultry weather, when the horse sometimes dies on the spot. Many a stage coach-horse is thus lost: it is the *coup-de-sang* as regards him.

This a state of sanguineous congestion.—When we have an opportunity of examining the brain in this case, no theoretical reasoning of the incompressibility of the brain, and the perfect fulness of the cranial cavity, and the impossibility of any material variation of the absolute quantity of blood in the brain, can deprive me of the evidence of my senses;—I find actual accumulation of blood in the vessels of the brain—in the arterial vessels to a very great degree, but mostly in the sinuses or other venous canals; the membranes are all injected, and deeply so; and even the vessels of the substance of the brain are in the same state; for, wherever the brain is cut, minute drops of blood follow.

Treatment.—Of apoplexy, determination of blood to the brain, and congestion there, without these immediate exciting causes, I shall speak in my next lecture: but the treatment of this sudden congestion is simple enough. Bleeding is the first step, and from the jugular vein, if a lancet or fleam is at hand, for thus we shall have the advantage both of general and local depletion,—we shall lessen the quantity of blood flowing through the system, and we shall empty the overloaded, and distended, and probably debilitated, vessels of the brain. The owner of the horse frequently adopts the temporary expedient of cutting the bars of the mouth. If this is but effected deeply enough, and in a line between the central and second incisors, and about an inch behind them, plenty of blood may be obtained, and we shall enjoy the advantage of general bleeding. The curb rein should be loosened, and, if possible, the collar eased. The prudent man will guard against a repetition of this attack: he will have the collar permanently altered, so that it shall not press upon the jugular; he will place the horse on a somewhat restricted and mash diet; and he will take the first opportunity of ad-

ministering a strong dose of physic. To this will follow occasional doses of alterative medicine, or, what is better, a run at grass.

Precaution.—Is all this necessary because a horse has happened to have a fit of the megrims? Yes, and more too, in the mind of the prudent man; for it is seldom that a horse has the megrims once, without having at least the predisposition to a second attack established. These over-distended vessels may be relieved for a while, but it is long before they perfectly recover their former tone and strength. It requires but a little increased velocity or force in the vital current once more to distend them and to produce the same dangerous effects. The testimony of experience is uniform about this, and he would not do justice to himself or his family who trusted himself behind a horse that had had a second attack of megrims.

Lecture XLVI.

APOPLEXY AND PHRENITIS IN HORSES, CATTLE, SHEEP, DOGS, AND SWINE.

Megrims is apoplexy under its mildest form. It is a determination of blood to the brain,—pressure on the origins of the animal nerves, and partial or total, yet temporary, loss of consciousness and voluntary motion. The horse is subject to a worse species of compression of the brain than this, and of which I am now to treat—*apoplexy*, recognised in our strange and disgraceful nomenclature under the name of *sleepy staggers*, in distinction from phrenitis, or, as the farrier calls it, *mad staggers*.

Early Symptoms.—There are usually sufficient warnings of its approach, if the carter or the groom had wit enough to observe them. The horse is a little off his feed; he is more than usually dull; there is a degree of stupidity about him; and generally a somewhat staggering gait. This goes off when he has been out a little while; but it returns under a more decided character, until at length it forces itself on the attention of those about the animal.

More advanced Symptoms.—The illness is usually first recognised by the horse standing with his head depressed; it bears upon or is forced against the manger or the wall, and a considerable part of the weight of the animal is apparently supported by this pressure of the head against some fixed object. As he thus stands he is balancing himself from one side to the other, as if he were ready to fall; and it is often dangerous to move him, for he falls without warning. If he can get his muzzle into a corner, he will sometimes continue there motionless for a full half hour, and then drop as if he were shot; but the next moment he is up again with his feet almost in the rack. He sleeps or seems to do so as he stands; or at least he is more than half unconscious of surrounding objects. When he is roused he looks vacantly around him; perhaps he will take a lock of hay, but ere it is half-masticated, the eye closes and he sleeps again with the food in his mouth. Soon afterwards you perhaps rouse him once more; the eye opens, but it has an unmeaning glare; you move your hand before it, but it closes not, you speak to him, you hollow to him, but he hears not: but the half-chewed food now drops from his mouth. The last act of voluntary motion which he will attempt is usually to drink; but he has little power over the muscles of deglutition, and the fluid returns through the nostrils. He begins to foam at the mouth—he is every moment balancing more from side to side, until at length he falls; his breathing is laborious, stertorous; it is performed by the influence of the organic nerves, and those of animal life no longer lend their aid. The pulse is slow and oppressed; the jugular vein is swelled almost to bursting, the muzzle is cold, and the discharge of the feces involuntary. The eyes are now open, protruded, fixed, and the pupils dilated. The animal grinds his teeth; twitchings steal over his face and attack his limbs, and they sometimes proceed to convulsions, and dreadful ones too; the animal beats himself about in a fearful manner, but there is rarely disposition to do mischief. In the greater number of cases, however, the convulsions last not long: all the powers of life are oppressed, and death speedily closes the scene.

Post-mortem Appearances.—The whole venous system is in a state of congestion, but the vessels of the brain are peculiarly turgid with black blood. Occasionally there is no inflammation of the brain or its membranes; but in the majority of cases, and particularly when the horse has been violent, there are evidences of considerable inflammatory action. The stomach generally contains a more than usual quantity of food; and where that viscus is empty, the large intestines are loaded with foul matter: in these cases, there is evident inflammation of the stomach or the intestines, according as either of them are thus overloaded.

M. Girard has recorded a case in which a horse died of staggers, with many of the characters of phrenitis. A large tumour was found in the right sac filled with sanious pus. The parietes of the tumour were much thickened, and dense bands ran across it from side to side. The small intestine was in many places contracted, and its surface was studded with numerous red and brown spots. There was no accumulation of food

in any part of the digestive canal. In another case, there were two congested tumours in the stomach, each of them covered with bots, and containing a multitude of worms no larger than a hair.

The kind of horses most exposed to this complaint.—This disease is found more frequently in the stable of the post-master and the farmer than anywhere else. We shall know by-and-by how to account for this. Thirty years ago it was the very pest of these stables, and the loss sustained by some persons was enormous; but as veterinary science progressed, the nature and the cause of the disease were better understood, and we have not one case now where we had twenty at that time.

Nature and Cause of the disease.—To account for this change we must consider for a moment the nature of the disease. I have already described it to be a determination of blood to the brain: pressure on the origins of the animal nerves, and by degrees on the organic too, and consequent loss of consciousness and of life. What causes this determination of blood to the head? Over-condition, and too great fulness of blood. Ideas of *condition* in the horse prevail now very different from those by which our forefathers were guided. It no longer consists in the round, sleek carcase, fat enough for the butcher, if the flesh were eaten here; but in fulness and hardness of muscular fibre, and a comparative paucity of cellular and adipose matter: in that which will add to the power of nature, and not oppress and weigh her down.

The improper system of Feeding, a cause of Staggers—The Coach Horse.—The system of exercise is better understood than formerly. It is proportioned to the quantity and quality of the food; and, more particularly, the *division* of labour is more rational. The stage-horse no longer runs his sixteen or eighteen miles. I recollect one stage of two-and-twenty miles which the same team of horses used daily to run; and then, exhausted and famished, they were turned into the stable for the next twenty hours. The food was eaten voraciously—their (comparatively) little stomachs were distended with it before nature had sufficiently recruited herself to carry on the digestive process; and there it remained a source of general oppression and danger: and, either by the actual distention of the stomach, the vessels of that viscus were compressed and the flow of blood through them arrested, and more blood sent to other parts, and to the brain among the rest,—and more to the brain from its known sympathy with the stomach; or that powerful sympathy which undeniably exists between these two important parts, being sufficient to account for any cerebral derangement, without this mechanical obstruction of the circulation in the one, and extraordinary determination of it to the other,—whatever was the cause, these horses were sadly liable to staggers, and many of them perished every year.

Illustration.—The custom then prevalent of giving a considerable quantity of dry bran mingled with corn, was not a little injurious, for few things are so indigestible as the husk of the wheat. In one of our largest breweries it broke out as a kind of pest, and they lost more than twenty horses in a very short time. The principals were dissatisfied, and they applied to another veterinary surgeon, who traced the malady to the inordinate use of dry bran, and which had not been long introduced into the stables. He forbade the use of the bran except in the form of a mash, in which the cortical portion of the wheat was somewhat macerated and softened, and the plague was immediately stayed.

The Farmer's Horse.—The farmer also used to send his horses out early in the morning, and keep them at plough for six or eight hours; and then they were brought home, and suffered to overgorge themselves, and many of them were attacked by staggers and died: or, if the evil did not proceed quite to this extent, the farmer's horse was notoriously subject to fits of heaviness, dulness, sleepiness; he had *half-attacks* of staggers: and then ensued another consequence, unsuspected at the time, but too prevalent among them—he became blind. The farmer was notorious for having more blind horses in his stable than any other person, except perhaps the post-master: and it was a peculiar kind of blindness to which these horses were subject—amaurosis—glass-eye, palsy of the optic nerve. This nerve, as it winds its course across the crura cerebri both before and after its apparent decussation, is particularly exposed to pressure when there is this determination of blood to the brain; hence in the human being a peculiar dizziness, an indistinctness of vision, an illusory motion of surrounding objects, or the creation of a thousand imaginary ones, constitutes the very essence of vertigo; and is one of the earliest and truest warnings of the approach of more serious cerebral affection.

French account of the connexion of Amaurosis with Staggers.—The Recueil de Médécine Vétérinaire for June 1828, contains some interesting cases of amaurosis following the successful treatment of apoplexy. They are related by M. Berger Perriere. He tells us that the inhabitants of the neighbourhood of Bourgoin are very poor, and their horses ill-fed. The horses are worked without food from an early period of the morning to night-fall, and then turned into a meadow until ten or eleven o'clock. They are afterwards led to the stable for a few hours' rest,

and at three or four in the morning are again turned out to pick up sufficient sustenance for the day; and this vicious system is pursued during every change of season, and however severe may be the labour exacted. The consequence is, that staggers is very prevalent there, and may almost be considered as an epizootic.

M. B. P. visited two horses that had staggers. They were dull; the head resting against the manger; the respirations low and deep; and the pulse small and concentrated. He purged them both—one died: the other recovered, but in two months he became blind.

In the following month he had another case: it was a mare, she recovered from the staggers, but in two months she became blind.

Three months after this, he attended on a horse near Havre with staggers. The animal recovered, but a month afterwards, it was observed that he lifted his fore-feet higher than usual; that the slightest noise frightened him; and that his ears were in perpetual motion. On careful examination it was ascertained that he was perfectly blind in the right eye, and could see very little with the left. At the expiration of nine months, M. B. P. happened to see the horse again; amaurosis was then complete in the right eye, but the left eye was merely sensible to the distinction between light and darkness.

Staggers may probably lay the foundation for Amaurosis.—I have a perfect recollection of one case, in which amaurosis appeared to be the consequence of staggers. Six weeks elapsed between the cure of the staggers and the occurrence of blindness. I confess that I did not then trace the connexion between these diseases; I was not in possession of these facts; and we have too few successful cases of staggers: but I can now imagine that occasionally, and oftener than we are aware (for the time which is interposed between the two may mislead us), the foundation for amaurosis may be laid when the origins of all the animal nerves, and these among the rest, and more than any of the rest, are oppressed and injured by the accumulation of blood.

The records of human medicine contain the history of the case of a female who was every day blind for a little while after her principal meals.

The system of Feeding the grand cause of Staggers.—The system of horse-management is now essentially changed. Shorter stages, a division of the labour of the day, and a sufficient interval for rest and for feeding, have, comparatively speaking, banished *the sleepy staggers* from the stables of the post-master; and the morning and afternoon labour of the farmer's horse, with the introduction of that simple, but invalable, contrivance, the *nose-bag*, have rendered this disease comparatively rare in the establishment of the agriculturist. To whom we are indebted for these important improvements I know not: perhaps dearly-bought experience gradually taught the farmer and the post-master wisdom.

Mr. White's Account of the Epizootic in Swansea.—Mr. White, in the third volume of his "Treatise on Veterinary Medicine," gives an account of a disease, as he says, "very nearly resembling stomach-staggers," which had proved exceedingly destructive in the neighbourhood of Swansea, and particularly in the mines. One gentleman lost more than a hundred horses in one year; and some had lost their whole stock twice in a year. Had he, however, attended more to the symptomatology of the disease (and which, generally speaking, constitutes the excellence of his work), he would not have puzzled either himself or his readers, by his speculations on its contagiousness or epizootic character—circumstances which no one now believes to appertain to staggers. The consideration of this, however, would detain me too long; and my present purpose will be answered by warning you against being misled by the long account which Mr. White here gives of this malady, somewhat "resembling," but essentially distinct from, stomach-staggers.

The Causes of Staggers continued.—Old horses are more subject to staggers than young ones: the stomach is weak; the food is apt to be retained in it, and to become a source of general, and particularly of cerebral, disturbance. The vessels of the brain are weakened; they yield to a force which, in youth and health, they would have successfully resisted; and, having yielded, they have less power to resume their former energy, and once more contract on their contents.

Horses at grass are occasionally attacked by this disease; but they are generally poor, hardly-worked, half-starved animals, and turned on richer pasture than their impaired digestive organs are equal to: perhaps the weather is then hot, and the sympathy of the brain with the undue labour of the stomach is more easily excited, a determination of blood to the brain far more easily effected.

The symptoms of staggers in a horse at grass are somewhat singular. The animal cannot easily find a place on which to press his head; but still he is throwing his weight forward, and he goes on in a straight line, until at length he is found entangled in a hedge, or drowned in a ditch.

Mr. Percivall gives a very satisfactory illustration of the production of staggers in this way. He says, that when his father

entered the service of the Ordnance (and in which he continued more than thirty years, with the highest credit to himself and advantage to the service;—he was one of the most straightforward practitioners, and the kindest friend, and the most honourable man, I ever knew), it was the custom to turn horses, which had become low in condition, and still upon their legs from work, into the marshes to recruit their strength. During the months of July, August, and September, no case was more common than an attack of staggers among these horses, and which his father rightly attributed to the luxuriant pasture they were turned into, combined with the dependent posture of the head, and the sultry heat they were exposed to in marshes destitute of places for shade. They were relieved, provided they were timely attended to, by the free and immediate use of the lancet.

A more general View of the Causes of Staggers.—Cases of staggers have occurred in which the stomach was nearly or perfectly empty; but then we usually found that some of the viscera were overloaded. Even the cause of disturbance has also been wanting; but there has been inflammation of the mucous coat of the stomach and intestines. In a few instances no existing cause of this cerebral affection could be detected. The thoracic and the abdominal viscera were perfectly sound; but there was venous congestion everywhere, and particularly in the cranial cavity. In the greater number of cases, however, the disease was clearly of stomachic origin; and we are warranted in regulating our treatment by the expectation that we shall find this in the particular case that is brought before us. We will not dispute whether it is the distention of the stomach, as first taught by Mr. Coleman, or inflammation of that viscus, as inculcated by Mr. Blaine; or whether it may not result from morbid irritability of any other portion of the digestive apparatus, or of the digestive apparatus generally; or whether it may not sometimes appear when the digestive organs have nothing to do with it. The prevalent cause is, plainly, distention of the stomach, or sympathy between the brain and the stomach; and on this view of the disease we are justified in acting: although it cannot be denied that the causes of staggers are free from being confined to the stomach alone; it may be produced by abdominal irritation anywhere.

Very strange accounts are given of the quantity of food occasionally found in the stomach in these cases. There is a well-authenticated record of the stomach and its contents weighing sixty pounds. The stomach was not ruptured; but the coats of the viscus were so attenuated by the distention which such an enormous mass must occasion, that they were lacerated with the slightest touch. Mr. Percivall relates two cases, in one of which the contents of the stomach weighed forty-five pounds, and in the other fifty pounds.

The importance of Inquiry as to the Cause.—We should, however, institute the most diligent inquiry into the previous circumstances of the case. Does it arise from improper management, to which the horse has been, in a manner, habituated?—long labour and fasting, and then the opportunity of gorging to excess? or does it proceed from accidental repletion? from the horse having got loose in the night, and found out the corn or the chaff-bin, and filled his stomach almost to bursting? There is nothing in the appearance of the animal that will enable us to discover the cause; no yellowness of the skin, no twitchings of the panniculus carnosus, as some have described, no characteristic swelling of the abdomen, for in most of these cases both the stomach and intestines are distended with gas. We must get at the truth of the matter as well as we can, and then proceed accordingly.

Treatment — Bleeding.—Whatever is the cause, the effect is determination of blood to the head, and therefore bleeding is the first measure indicated. It is sanguineous apoplexy, and the vessels of the encephalon must be unloaded.

The Jugular Vein to be opened. — The jugular is the vessel immediately indicated, as that the opening of which promises the greatest benefit. It is easily got at; it is large; and the blood may be drawn in a full stream: and, being the vessel through which the blood is returned from the head, venesection here will embrace the double advantage of local and general bleeding. The greater part of the blood will be drawn from the over-loaded organ; while the quantity that may be easily and rapidly abstracted from that organ will have its desired general effect.

No definite quantity of blood to be taken away can be fixed. We have done with this method of blood-letting; we look to the effect produced, and not to the number of pounds; and the horse with staggers should be bled until the pulse falters, or the animal begins to blow, or, perhaps, with more assured success, until he falls.

Not from the Temporal Artery.—Some have proposed to bleed from the temporal artery; and they tell us, that although it is a good thing to carry away the surplus quantity of blood, it is a much better one to cut off the supply. Granted: but the supply is not cut off by opening the temporal artery, for no portion of its blood goes to the brain. It is justly described by our first anatomical writer as one of the termi-

nating branches of the external carotid. It is difficult to open it so as to obtain a stream that promises any success; and it is often difficult to stop the bleeding unless the vessel is cut across, and thus retracts by its inherent elasticity, and becomes compressed by the neighbouring integument and cellular substance. I sometimes fancy that it is a very foolish species of charlatanism which induces us to select the temporal artery. The jugular may do very well for common occasions, or for thoracic and abdominal complaints; but here is a serious affection of the head, and we may be thought to display our practical skill by selecting a vessel belonging to the head for the abstraction of blood. We should take care, however, that no *practical anatomist* stands by when we make this attempt at effect.

The necessity of ascertaining the Cause of the Disease again enforced.—We must next turn to account the intelligence which we have obtained of the previous circumstances of the case. Is it known that the animal had got at the corn, or pea, or chaff-bin, and that his stomach is probably distended to the utmost; or, at least, so distended as to be unable to contract upon its contents? or on that or the preceding day had he worked harder or longer than usual, and then, according to the foolish kindness of many travellers, had had a double feed of corn given to him, or was suffered to eat as much as he liked? In this case I ask, with my excellent friend Mr. Percivall, of what avail can we expect our physic to be, introduced into a stomach already crammed with indigested food? what effect can even twelve or twenty drachms of aloes have poured down the œsophagus, and scarcely able to penetrate into the stomach?

The Stomach-pump.—We have relieved congestion, and somewhat lessened the tendency to inflammation by our bleeding; but we must not leave the cause of that congestion and inflammation untouched, and we should not touch it by our physic. Then next comes the stomach-pump—to us one of the most valuable discoveries of modern times, and affording us the means of combating several diseases, which had previously set all medical skill at defiance. We must inject warm water—the horse is incapable of offering much resistance—and we must continue the injection not only until we have so far diluted the contents of the stomach that a portion of them will escape through the pyloric orifice, but until the obstruction to vomiting offered by the ureter-like entrance of the œsophagus is overcome, and the food is returned through the nose or the mouth.

Physic.—This being effected, or we having ascertained that there was no extraordinary cause for the disease, nor probable extreme distention of the stomach, although it may still be the result of bad management; or that by mere possibility, and in a very few instances, this affection of the head can be traced to no assignable cause, then we administer our physic. The aloes will be the best, and in quantity varying from six to twelve drachms. Thus the intestinal canal, which to a greater or less degree will share in the oppression, will be evacuated, or some cause of irritation probably removed.

The doses of Aloes administered by some French Veterinarians.—I cannot, however, recommend you to adopt the seemingly outrageous doses of aloes to which some of our continental brethren have recourse. M. Mangin had tried without success various methods of treating staggers; but observing that in many cases the large intestines were filled with a great quantity of fæces, he began to suspect that they, and not the stomach, might occasionally, or oftener than we suspected, be the seat of the disease, and he determined that he would try what strong purgatives would do. He soon had opportunity, and, in the space of twelve hours, he gave to a horse with staggers four drinks, each of them containing two ounces of aloes and three ounces of Epsom salts. The horse was well on the sixth day. He gave the same quantities of purgative medicine to three other horses, and he saved them all. This becoming a matter of much remark, Professors Dupuy and Bardin were desired by the French government to examine into the matter. They reported that the cases had been correctly stated, yet, notwithstanding the success which attended the treatment, they were disposed somewhat to blame M. Mangin for administering such large doses of aloes in so short a time. The practitioner replied, that the horses being in a comatose state purgative medicines would not act with their usual energy; and so the matter rested. To a certain degree M. Mangin was right, yet he should have recollected that the organic nerves were not those primarily affected in such cases, and I confess I should be loath to give such doses.

Tonics.—Many practitioners are fond of strong stimulants given internally, and with the view of causing the stomach to contract upon its contents. If they are admissible at all, it is in order to restore the tone of the stomach after the greater portion of its contents have been expelled. I should prefer giving them with the physic. I would add double the usual quantity of ginger to the physic ball; or if I gave my physic in the form of a solution of aloes, I would add an ounce of the tincture of ginger.

The beneficial Effect of Bleeding. — A French veterinary surgeon has recorded in the Recueil de Méd. Vét. tome v., two cases of the successful treatment of staggers running on to phrenitis.

He thus describes the first case. A horse, after a fatiguing day, was suddenly taken ill. M. Gerard found him with his head depressed, resting upon the manger, and the forehead forcibly pushed against the wall. His breathing was laborious; the eyes were haggard and very brilliant; the ears cold; the subcutaneous veins of the head swelled; the pulse hard and slow; the body covered with perspiration, and the extremities cold and drawn together. M. Gerard attempted to bleed him, but he was seized with a violent paroxysm—leaped into the manger, and beat his head against the wall. M. G. however succeeded in abstracting nearly seventeen pounds of blood. The animal became quiet, and remained in a dosing state all night; and it was observed on the following morning, that the pulse was free, the eye fixed, and the sight gone. Ten pounds more of blood were abstracted, and a drink with opium attempted in vain to be given. In the evening he became frightfully violent. M. G. managed to cut off his tail, and he was suffered to bleed until he fell exhausted; and even then the bleeding was permitted to continue, until it stopped spontaneously.

On the next morning he was quiet; he had partly recovered his sight, and was eating. Eight days afterwards he returned to the ranks.

Observations.—This is a valuable case, as illustrating the beneficial effect of venesection in this case, and the extent to which it may be safely carried.

Effect of Opium.—The second case recorded by this gentleman is a very singular one. A horse, apparently well over-night, was suddenly seized with a violent fit of mad staggers. He had broken from the stable, and escaped into the yard, and destroyed everything within his reach, but was at length exhausted, and was lying on the ground when M. Gerard first saw him. He was completely blind, the jaw was locked, the body covered with sweat, and the pulse inexplorable, although the artery was distended. He opened both the jugulars, and abstracted twenty-nine pounds of blood. Four hours afterwards the horse was down, with his head against the wall, and with occasional spasmodic movements of it. The pulse was fifty-six and strong, and the blindness continued. M. G. abstracted ten pounds more of blood, and not content with this, docked the horse, and suffered the bleeding to continue as long as it would. At night the pulse had sunk to forty, when M. G. gave *two ounces and a half of indigenous opium* in a drink, and administered two ounces more in the form of injection.

On the following morning the pulse was soft, and the horse had partly recovered his sight. The same quantity of opium was repeated by the mouth, and administered in an injection, morning and night; and also on the three following days, but whether once or twice in the day, the report does not clearly express. The horse had been getting better all this while, and on the tenth day from the first attack he returned to his work.

Observations.—This is a marvellous account. I give it to you as I find it, and it should have a page in your case books. The good effect of bleeding I can well believe, although I should not have dared to have carried it to such an extent. I think that I should have been satisfied with abstracting forty pounds of blood in four hours, without the after and long-continued bleeding from the tail: but as to the opium, I must agree with M. Yvart that the effect here attributed to it is contrary to all experience. We find that it not unfrequently produces states of the system not unlike staggers. When we give it in considerable quantities in cases of violent and obstinate diarrhœa, it usually does its duty, so far as the mucous membrane of the intestines is concerned, but the horse becomes somewhat dull and off his feed. The case, however, is worth recording, and you will judge of it as you think proper.

After Treatment.—This must be regulated by circumstances. For a while the horse should be put on a restricted diet: mashes—green meat in no great quantity—a moderate allowance of hay—little corn. When sufficiently recovered, he may be turned out with advantage on rather bare pasture.

Liability to return.—One circumstance, however, should never be forgotten, that the horse that has once been attacked with staggers is liable to a return of the complaint from causes that would not affect another horse. The distended vessels are weakened, the constitution is weakened, and prudence would dictate that such a horse could not be too soon disposed of.

APOPLEXY IN CATTLE.

Oxen are far more subject to apoplexy than the horse. They are naturally more plethoric. They are continually under the influence of a more stimulating and forcing system; and that without the exercise, by means of which the injurious effects of this system are in a great measure counteracted. The food of the horse is regulated by this consideration, that while he obtains muscular power equal to the work we require from him, there shall be no useless accumulation of fat to impede him in that work; whereas

the very object in the feeding of the ox is to clothe him with as much flesh and fat as possible, consequently he is far more subject than the horse to all the diseases connected with redundancy of blood, and to apoplexy among the rest.

Symptoms.—There are few premonitory symptoms in these cases. The animal is struck all at once. The disease is termed *blood-striking*. Had he been closely observed, it might have been perceived that he was more than usually indisposed to move, that the breathing was a little laborious, and the eye somewhat protruding: but the herdsman takes no notice of trifles like these. *The animal seems to be struck all at once;* he falls, breathes stertorously and heavily, struggles with greater or less violence, and dies, sometimes in five minutes—oftener at the expiration of a few hours.

Remedial measures.—If we had time to do anything we should bleed; we should here, as well as in the horse, abstract as much blood as we can. To this should succeed a dose of physic. The Epsom salts are the best we can give, in doses of a pound and a half in such a case as this, and without any carminative, and followed up by doses of half a pound every two hours until the physic operates; its action should then be maintained by half-pound doses of sulphur every morning.

APOPLEXY IN SHEEP.

This disease is more prevalent and more fatal in the sheep than in the ox. I will suppose a flock of sheep, apparently in perfect health, grazing on a pasture somewhat too luxuriant; they have been lately put upon it; they perhaps have been driven a little distance to it, and the weather is hot; or we will merely suppose that the pasture is good and the sheep in high condition. All at once, one of them stands still, he remains as he were fixed; he is unconscious of everything about him: by and by he begins to stagger, he falls, he struggles, usually not much, and he dies; and all this takes place in less than a quarter of an hour.

Premonitory Symptoms.—Here too, if the looker had done his duty, he would have been aware of what was coming. He would have seen that the sheep was dull, that it lagged behind in the flock, that its flanks heaved, and that rumination had ceased. Then we might have had some chance of subduing the disease, but none in the world afterwards.

Mr. Hogg, in his treatise on sheep, says, that such as feed in woods are subject to temporary fits of the staggers, appearing as if intoxicated; but they soon recover, except they are harassed or driven, or exposed to sudden exertion, or are previously full of blood. In his opinion, "nothing induces this temporary stupor more than a hearty feed on broom in frosty weather, and which so overpowers them that they will lie sprawling for several hours as if in their last throes. A shepherd of Traquair one day found a number of his sheep intoxicated in this way, and thinking that they were at the point of death, he cut the throats of four of them, that their flesh might not be lost; and he would have dispatched them all if his master had not opportunely arrived, and abused him for a blockhead, and asked him how he would like it if people were to cut his throat when he was drunk?"

Treatment.—Whenever a sheep is found lagging behind, standing still if he can, and with his head down, stupid, half blind and half deaf, he should be bled. No harm could ever ensue from this, and many an animal would be saved. It is a bad practice when the dead sheep are the shepherd's perquisite. I will not say that he will be purposely blind; but he will not have the stimulus to careful observation, which a regular perquisite for the detection of these incipient and obscure diseases would afford.

Bleeding.—This is the first measure, and to the extent which the case may indicate or that the animal will bear. I should take a pound as about the average quantity that should be drawn at the first bleeding; and that not taking from the eye-vein—the vessel usually opened by the shepherd and by the farrier too—for the most adroit of them cannot always obtain any great quantity of blood from this vein, and seldom can they obtain it so rapidly as it should be drawn; but from the jugular, a vessel quite as easily opened, and from which the blood will flow in a much fuller stream.

Physic, &c.—A couple of ounces of Epsom salts should be administered as soon as possible after the bleeding, and an additional ounce every two hours, until the bowels are opened. The animals should be moved to thinner pasture, or perhaps taken into the farm-yard and most sparingly fed.

APOPLEXY IN THE DOG.

I have never seen a case of true apoplexy, either serous or sanguineous in the dog. Almost every cerebral affection in this animal takes on the character of epilepsy. There is increased excitement, rather than depression. The pathological reason for this I am unable to give.

APOPLEXY IN SWINE.

In an animal fed to be "as fat as a bacon hog," you may expect that cases of apoplexy will be frequent enough; and so they are, and characterized by the same sudden-

ness of attack and fatal termination as in the ox and sheep. Sometimes it rages like an endemic through the piggery. The remedies are, as in the other cases, bleeding, but here from the palate, for we could not manage the hog sufficiently to open the jugular. Epsom salts or sulphur should be given as purgatives. The subsequent, and also the precautionary measures, are food less in quantity, or of a less stimulating character.

PHRENITIS IN THE HORSE.

We sometimes meet with primary inflammation of the brain or its membranes, or of both; and of the membranes oftenest when both are not involved. At other times, if the determination of blood to the brain, of which I have been speaking, is not sufficient to destroy the animal, it produces considerable irritation by its continued presence, and thus terminates in inflammation. The farrier calls this disease *mad staggers*, in distinction from the quieter malady, which we have been considering, and which he terms *sleepy staggers*.

Early Symptoms.—Whatever be the origin of phrenitis, its early symptoms are scarcely different from those of apoplexy. The horse is drowsy, stupid, his eye closes, he sleeps while he is in the act of eating, and doses until he falls: the pulse is slow and creeping, the breathing oppressed, yet stertorous and laborious. This is the description of apoplexy; the symptoms may differ a little in intensity and in continuance, but very little in kind. It is, nevertheless, most desirable that we should be enabled to distinguish the one from the other, in order that our preparation for the after stages may be different, and our treatment, if possible, even more energetic in the latter than in the former.

Difference between the Symptoms of Phrenitis and those of Apoplexy.—The phrenitic horse is not so perfectly comatose as his fellow that labours under apoplexy. The eye will respond a little to the action of light, and the horse is somewhat more manageable, or at least more susceptible, for he will shrink when he is struck, while the other often cares not at all for the whip.

In the duration of the early symptoms there is some difference. If the apoplexy proceeds from distention of the stomach, four-and-twenty, or six-and-thirty hours will scarcely pass without the cure being completed, or the stomach ruptured, or the horse destroyed; and if it proceeds more from oppression of the digestive organs, than absolute distention of the stomach, and from that sympathy which subsists between the stomach and the brain, the disease will go on; it will get worse and worse every hour, and this imperfect comatose state will remain during two or three days; but the apoplexy of the phrenitic horse will not often last many hours.

Should be vigorously attacked in this early state.—Now is the time for exertion, and with fair hope of success. Blood-letting and physic being now carried to their full extent, the horse will be materially relieved, and often cured; but if this golden time should be suffered to pass, or if remedial measures should be now ineffectual, the scene all at once changes, and the most violent re-action succeeds.

Later Symptoms.—The eye brightens—strangely so; the conjunctiva becomes suddenly reddened, and forms a frightful contrast with the transparency of the cornea; the pupil is dilated to the utmost; the nostril, before scarcely moving, being left to the influence of the organic nerves alone, now expands and quivers, and labours; the respiration becomes short and quick, the ears erect or bent forward to catch the slightest sound, and the horse, becoming irritable, shakes and trembles at the least motion.

The excessive violence of the Horse.—The irritability increases; it might be said to change to ferocity, but that the horse has no aim or object in what he does. He dashes himself violently about, plunges in every direction, rears on his hind legs, whirls round and round, and then falls backward with dreadful force. He lies for a while exhausted; there is a remission of the symptoms, perhaps only for a minute or two, possibly for a quarter of an hour. Now again is the surgeon's time, and his courage and his adroitness will be put to the test. He must open, if he can, one or both jugulars; he may attempt, if he has time, to open the temporals also: but let him be on his guard, for the paroxysm will return with its former violence, and without the slightest warning.

The second paroxysm is more dreadful than the first. Again the animal whirls round and round, and plunges and falls; he seizes his clothing and tears it to pieces; perhaps, destitute of feeling and of consciousness, he bites and tears himself. He darts furiously at everything within his reach; but no mind, no design, seems to mingle with and govern his fury.

Closing Symptoms.—Another and another remission, and a return of the exacerbation follows, and then, wearied out, he becomes quiet: but it is not the quietness of returning reason, it is mere stupor. This continues for an uncertain period, when he begins to struggle again; but he is now probably unable to rise, he pants, and foams, and, at length exhausted, he dies.

How distinguished from Colic.—There are but two diseases with which phrenitis can

be confounded, and they are colic and rabies. In colic the horse rises and falls, he rolls about, and kicks at his belly, but his struggles are tame compared with these. There is no involuntary spasm of any of the limbs; but the horse is sensible, and, looking piteously at his flanks, seems to tell us the seat of his pain. The beautifully, fearfully excited countenance of the one, and the piteous anxious gaze of the other, are sufficiently distinct; and, if it could be got at, the bounding rapid pulse of the one, and that of the other, scarcely losing its natural character in the early stage, could not possibly be mistaken.

How distinguished from Rabies.—In rabies, when it does assume the ferocious form, there is even more violence than in phrenitis; and there is method and treachery too in that madness. There is the desire of mischief for its own sake; and there is frequently the artful stratagem to allure the victim within the reach of destruction. There is not a motion of which the rabid horse is not conscious, nor a person whom he does not recognise; but he labours under one all-absorbing feeling, the intense longing to devastate and to destroy.

Post-mortem Appearances.—The study of these is a neglected but most valuable branch of veterinary education, yet if there is any disease in which I should be inclined to doubt the dependence that could be placed upon them it would be this. They are strangely, incomprehensibly, uncertain. I have seen the highest injection and inflammation of the membranes, and evident injection and inflammation of the substance, or portions of the substance of the brain; I have seen them both combined: and I have seen other cases, in which the horse had been furious to an extreme, and yet scarcely any trace of inflammation, or even of increased vascularity could be detected. There were circumstances however about these cases which cast a faint light upon them, but into which it would be tedious to enter here. The lesson which you will learn from this uncertainty of morbid appearance, is to be very cautious in your prognosis. Young men often do themselves incalculable injury by their foolish tattling about the anticipated progress and result of disease, and of the appearances which they shall find to justify all their pretty speeches and absurd predictions.

Treatment. — Here again, gentlemen, comes the old story, yet a little varied: bleed—take as much blood as you can get—let the animal bleed on after he is down—*do not pin up the phrenitic horse at all.* You will never lose your patient by this—you will never do harm—but you may knock down the inflammation; and the first blow is here the whole of the battle.

Physic.—Then the physic; it should be that which can be readiest given, and which most speedily acts. The farina of the croton will here deserve the preference, and in no little dose either. I would give half a drachm. The intense inflammation of the brain gives me full assurance that I shall not easily set up any dangerous inflammation in the intestinal canal. This can be made into a very little ball, or drink, and, in some momentary remission of the symptoms, I may give the one with the probang or the stick, or the other with the horn. Sometimes the apoplectic horse, when he will take nothing else, and is unconscious of everything else, will plunge his nose in his gruel, and sip and swallow a little; and I have seen the phrenitic horse drink with the utmost avidity a little water that was offered to him. Repeated doses of purgative medicines may perhaps be thus given, must be repeated until the bowels respond.

Blisters.—We may next call in another powerful subduer of inflammation, but not in the efficient manner that we could wish. A counter irritant, applied as nearly as possible to the seat of inflammation, will usually divert a portion of the inflammatory action from the old to the new tissue; and therefore we apply a blister over the forehead in this case, as soon as we can do so with proper regard to our personal safety. The cranial roof of the horse, however, is not only defended by the dense parietal bones, but they are thickly covered by a mass of muscle — the temporal muscles; and therefore the thickness of the bone and of the muscle is interposed between the brain and the new surface, which we expose to inflammatory action. The effect is consequently weakened, but some good may notwithstanding be done, and a blister should not be omitted. As for rowels and setons they would be perfectly useless here; the business would be settled, ere they would begin to act.

Medicine.—Sedatives are here manifestly indicated if they can be given. Digitalis will stand at the head of our prescription in such a case. Its first and most powerful action is on the heart, diminishing both the number and strength of its pulsations; while at the same time it is a diuretic, but of no great power in the horse. To this must be added the other component parts of the fever ball—emetic tartar as a diaphoretic, and nitre as a diuretic, and a refrigerant; but we must have no hellebore. If hellebore acts at all as a sedative, it is by promoting a somewhat unusual determination of blood to the brain, and thus causing a diminution of nervous agency. This may be excusable, or even beneficial in pneumonia; but we have here too much determination of blood to the brain already.

We must not be solicitous about feeding here; no attempt should be made to coax the horse to eat: and even when appetite returns with the abatement of the inflammation, we must be exceedingly cautious with respect to both the quantity and the quality of the food.

Prognosis.—In such a case our prognosis must be very guardedly formed. No opinion should be given until some hours have passed after the first bleeding. If the pulse then becomes developed and soft, a germ of hope may be encouraged. If after the furious state has commenced, and before the strength of the horse is exhausted, the violence should abate, and the animal become conscious of surrounding objects, and less irritable, these may be regarded as favourable circumstances; but if the delirium remains unabated, after copious depletion has taken place, little hope can be encouraged.

PHRENITIS IN CATTLE.

The Frenzy or Sough in cattle is too well known to the farmer and the practitioner. There are generally at first much oppression and heaviness; the animal can scarcely be induced to move; the eyes protrude and are red; the respiration is hurried, and delirium more or less intense rapidly succeeds. The beast rushes at everything in its way—it mischievously selects its objects—it is in incessant action, galloping about with its tail arched—staggering—falling—bellowing hideously—its skin sticking to its ribs, and the sensibility of the spine exceedingly increased. There is, even in health, a peculiar formation of the eye, or a sensibility of the retina to certain colours, which makes the beast dislike a brilliant red; under this disease it excites him to the highest pitch of fury.

If, however, the previous oppression and stupidity are much less in the ox than in the horse, so is the succeeding violence increased; not even a rabid ox is a more fearful animal; and it is somewhat difficult to distinguish between the two diseases. There will probably be some history of a previous bite belonging to the rabid ox; and in the early stage, although there may be lowness or oppression, there is nothing like apoplexy or want of consciousness. Beside, with greater fury there is more method in the madness of the rabid than the phrenitic ox. The latter will run at everything which presents itself, but it is a sudden impulse. The former will, like the horse, plot mischief; he will endeavour to lure his victims within his reach. A much greater quantity of foam will be discharged from the mouth of the rabid than the phrenitic ox.

The causes are much the same as those of apoplexy—too stimulating food and too great redundancy of blood, to which may generally be added some immediately exciting cause, as hard and rapid work in sultry weather, over-driving, &c. In the neighbourhood of London too many instances of phrenitis occur from the latter cause. It once used to be the sport of brutes in human shape to excite it by selecting a beast from the herd, and driving it furiously from street to street.

The post-mortem appearances in the ox are always characteristic of the disease. The vessels of the cerebrum, the cerebellum and the spinal chord, are highly injected—the membranes of the three are also loaded with blood. The lateral ventricles are distended with a serous fluid. The fourth stomach and the small intestines usually exhibit the most decided traces of inflammatory action. To a certain extent, however, and sometimes to a degree almost inconceivable, the whole venous system is gorged with black blood.

As to the treatment of phrenitis in cattle, there is some difficulty. Is any treatment practicable? Is human life to be hazarded? Cases will occur in which the bullet will be the best remedy; but then the flesh may be in such a congested state that it cannot be sold. If the beast can be managed or approached during a momentary remission of the symptoms, bleeding should be attempted; and if a vein can be opened, it should be suffered to bleed on as long as it will. Physic, if it can be given, will be indicated. Sometimes the beast labours under an insatiable thirst; and as his taste is not very exquisite now, he may be cheated with water in which Epsom salts have been dissolved. If there is time to get down a horn ful of drink, a scruple, or half a drachm of the farina of the croton nut may be administered, mixed with a little gruel. All other medicines are completely out of the question. If bleeding and physic will not save the ox, nothing will. Use should also be made of any temporary respite to confine the animal; or if possible to get him into some place where he cannot do much harm to himself or to any one else. Some persons have recommended setons of the black hellebore root inserted into the dewlap, and when these begin to act, they do generally act most tremendously; but the animal will have recovered, or he will be dead before the seton can have any influence. The frenzy being subdued, the next consideration is, what is to be done with the beast. No more dependance can be placed on him than on one that had recovered from a fit of apoplexy. The purging system should be continued to a moderate degree; and the fever medicine given to abate the

quickness of the circulation; and then, when the congested blood is got pretty well out of the system, and the flesh will look well, and has become healthy, the sooner the beast is disposed of the better.

PHRENITIS IN SHEEP.

In the sheep the symptoms are the same—the eyes bright and prominent—the flanks heaving—the animal in constant motion; it cocks its tail and gallops about the field, and attacks his companions, or the shepherd, or even a post or tree that may chance to attract its attention.

Lambs.—In lambs the symptoms are sometimes very curious—they leap and jump about, and exhibit the most ridiculous antics. Mr. John Lawrence says that "on the borders of Suffolk several scores of lambs were seized with an uncommon malady, leaping and jumping about the fold-yard in a strange manner; and a dunghill being raised to a level with the eaves of a low-tiled barn, a number of the lambs ran skipping up to the top of the roof, as though they had been possessed by more devils than Mary Magdalene, or even the nuns of Loudon. The whole parish wisely concluded that they were bewitched, and a wretched and aged pauper became the object of their suspicion and deadly hatred. The senseless and infernal supposed prevention of witchcraft was recurred to, namely, burning one of the poor animals alive."

Causes and Treatment.—These bear so close an analogy to what I have described in cattle, that I will not detain you by the repetition of them.

The dog is also comparatively exempt from phrenitis. I never saw a case of what I could satisfy myself was pure phrenitis in the dog. These exemptions are singular; and, as veterinary science progresses, will be a subject of interesting inquiry.

Lecture XLVII.

TETANUS.—THEORY OF THE COMMUNICATION OF NERVOUS INFLUENCE.—SYMPTOMS OF TETANUS.—PROGRESS OF THE DISEASE.—POST-MORTEM APPEARANCES.—CAUSES.

Sketch of the Nervous System.—I have described the spinal chord as divided by a mesian line through its whole extent; and each side again divisible into three columns, and each of these devoted to a distinct and separate function. The central columns on the inferior surface (the anterior one in the human being) are connected with voluntary motion—the central columns on the superior (posterior) surface, with sensation, and the lateral column on either side with the movements and peculiar sensibility of organic life. The two first we have traced to the brain: the mandate of the will or the nervous influence is conveyed by the inferior columns from the brain to the various organs of voluntary motion, and so we move and act amidst the objects that surround us. The impressions that are made on the extreme fibrils of other nerves are conveyed to the common sensorium by means of the superior columns, and thus we have sensation, pleasurable or painful. The lateral column however is a system of itself, and not of cerebral origin; connected with, influenced by, and influencing, aiding, and assisting, the other two as its very situation would lead us to suspect: but independent of both: possessing properties similar to both, yet devoted to the functions of organic life.

There are certain classes of diseases principally referrible to one or the other of these columns. I will consider each in the order in which I have mentioned them.

I begin with those of the central column of the inferior surface and connected with voluntary motion.

Theory of the communication of Nervous Influence.—You will find a beautiful explanation of the flow or communication of nervous influence to the various parts of the system, in that admirable work by Dr. Mason Good, his "Study of Medicine;" a work that should find a place in your libraries, as yielding to none in a clear, natural, and interesting explication of the principles of human pathology, and physiology too. I will use his own language:—"We have had frequent occasions of showing that the nervous power which supplies the muscular fibres is communicated, not strictly speaking in a continuous tenour, but in minute and successive jets; so that the course of it is alternately broken and renewed by a series of fine and imperceptible oscillations. In a state of health and vigour this succession of influx and pause is perfectly regular and uniform; and hence whatever movements result from it will partake of the same uniformity, and appear to be one continued line of action instead of a successive series. But as soon as ever the harmonious alternation through which the nervous power is thus supplied is interfered with, the oscillations become manifest; the apparently uniform current is diverted into a tremulous undulation; and the muscular exertion to which it gives rise, instead of being seemingly one and undivided, is sensibly multiplied into hundreds."

Adopted to illustrate the Diseases of the Spinal Chord.—I would scarcely go so far as this excellent writer has done, when he says that "the truth of this theory is shown or proved," but there are so many circum-

stances which give an air of probability to it, such as the firmness of the sound and healthy limb—the trembling of the hand fatigued by labour—the shaking palsy of old age—the agitation of every limb when the animal is violently excited—and, above all, this theory furnishes me with so intelligible an illustration of the diseases of the nervous system, that I shall adopt it, for the present purpose at least.

Illustration of the Diseases of the Spinal Chord.—"In health, the succession of influx and pause is perfectly regular and uniform, and the motions resulting from it appear to be one continued line of action," energetic in proportion to the degree of nervous influence bestowed; but I can conceive of some diseased state of the sensorial system in which the nervous energy shall rush on with unusual violence and without pause, and in defiance of the will. If one limb only is affected, we have rigid *spasm* of that limb; if it is a general affection, we have *tetanus*. If the pauses or relaxations are too protracted, then, from the accumulation of nervous power, the next jet has more than usual strength, and we have *shivering* and *trembling*. If the protraction is more considerable, and confined to one set of muscles, we have *chorea*. If this is universal, and the suspensions lengthened, yet the expenditure of animal power increased, we have *epilepsy*; and if the supply is altogether suspended, we have *palsy*.

Further illustration.—These diseases are all connected together—they have a tendency to run into each other. Chorea in the dog is a frequent precursor of fits. The spasmodic affection of one limb is speedily propagated to the neighbouring ones, and gradually involves the whole frame; and fits either become less frequent and violent, and terminate in chorea; or they increase in the rapidity with which they succeed to each other, and the vital power is at length nearly or quite expended, and partial or total palsy succeeds.

Theory of Tetanus.—The disease which will occupy our attention this evening is TETANUS, or as it is commonly called, LOCKED-JAW; and so termed because the forcible closing of the mouth is one of the earliest and most prominent, although not the invariable symptom of tetanus. It is constant spasm of the voluntary muscles, and particularly those of the jaw, the neck, and the spine. The old farriers used to call it "Stag Evil;" whether from its being supposed, but I think erroneously, to be a disease to which the stag is very subject, —or from the well-known fact, that when the stag is nearly hunted down he takes refuge if he can in some pond of water, where he stands at bay, and from which he is said to become stiff and tetanic, from the sudden effect of the cold,—or whether because the tetanic horse carries his head in somewhat the same manner that a stag usually does—I will not now inquire.

Symptoms.—Its approach is usually slow and insidious—at least it is so in the estimation and observation of the groom. The horse is dull—unwilling to move—he does not feed well,—he quids his hay and gulps his water. The groom attributes all this to sore throat, and when he begins to be alarmed by its continuance, and by the rapid manner in which the horse loses flesh, even from the very beginning, he sends for the veterinary surgeon. The mischief is all done now nine times out of ten.

Caution as to supposed Sore Throat.—The veterinary surgeon will never examine, or ought never to examine, a horse with supposed sore throat, without ascertaining the state of the muscles of the jaw; and yet I do recollect one; he was a young practitioner—so you may suppose; but he was a clever young man notwithstanding,—who saw the quidding, and the gulping, and the difficulty of opening the mouth, but was bamboozled by what the groom forced upon him of the soreness of the throat, and the foulness of the breath, and the enlargement of the parotid glands,—and lost for ever the golden opportunity. Let this be a rule with you—one without exception—in every case of supposed catarrh, or influenza, or, in fact, disease of almost every kind, introduce a finger or two into the mouth, and move them about there, not only to ascertain its temperature, but the action of the lower jaw; and if that is limited, satisfy yourselves whether this arises from the pain which the motion of it occasions, or actual inability to move it.

Continuation of Symptoms.—There will now, or ere this, be stiffness of the neck; and, on passing the hand down it, the muscles will be prominent, distinct, hard, knotty, and unyielding. There is difficulty in bringing the head round, and still greater difficulty in bending it, for the extensors of the head are in health more powerful than the flexors, having to assist in supporting the weight of the head. The difference of power in the two, therefore, shows itself now by the very peculiar manner in which the muzzle is thrown out and forward, and permanently retained there. The eye is sunk—the retractor muscle acts among the rest, and the eye is drawn deep within the socket; and in consequence of this, the fatty matter behind the eye is pressed forward, and the membrana nictitans is protruded, and there is an appearance of strabismus, or squinting. I confess that I have never seen what the erudite Mr. John Hinds describes:—"The eyes of the animal were turned back, showing the nerve which re

tained the ball in position in a very disgusting manner." I had supposed that the retractor muscle so completely surrounded the optic nerve as to render this impossible, especially under the state of spasmodic contraction in which this disease places it; but Mr. Hinds's book contains some very strange things.

The ears are erect, pointed forward, and immoveable; if you speak to the horse, or threaten to strike him, they change not their position. Considering the beautiful play of the ear in the horse, when in health, and the kind of conversation which he can maintain by means of it, there is scarcely a more characteristic symptom of tetanus than this immobility of the ear. The nostril is expanded to the utmost; and there is little or no play of its alæ, as in hurried, or even natural breathing. The breathing itself is usually accelerated, but not always so; I have known it rendered considerably slower; but it is always laborious, for the aid of some of the auxiliary voluntary muscles is withdrawn, and the rest have more to do. The pulse will give little indication of the severity of the disease. I have known it in a manner unaffected, when the spasmodic action was fully established. It would rise, and rapidly, when I approached the horse and offered to touch him; but after I had stood by him a minute or two, it would quiet down almost to its natural standard. After a while, however, the heart begins to sympathize with the excitation of the animal system, and the pulse increases in frequency and force, until the animal becomes debilitated, and then it beats yet quicker and quicker, but diminishes in power, and gradually flutters and dies away. I have counted 130 and 140 pulsations in a minute towards the close of tetanus, yet Mr. John Hinds tells us that it may increase to 60 when the disease is at its height, and becomes slower as the exhaustion of the animal increases, and at length beats not more than 40 times in a minute. When doctors disagree, why you, gentlemen, must judge for yourselves.

The countenance is eager, anxious, haggard: it is piteous to behold, and it tells plainly enough how much the animal suffers.

The Progress of the Disease.—The stiffness now gradually extends to the back. If the horse is in a narrow stall, it is impossible to turn him; and even with room and scope enough, he turns altogether like a deal board. The extremities begin to participate in the spasm—the hinder ones first, and principally; but never to the extent of which it exists in the neck and back. The horse stands with his hind legs straddling apart in a very singular way. We see something resembling this in affections of the kidneys, but it is not so marked as here: and when the horse is moved, the gait is still straddling to a remarkable degree; the whole of the limb moves, or rather is dragged on, together; and anxious care is taken that no joint shall be flexed more than can possibly be helped. The fore limbs have a singular appearance: they are as stiff as they can be, but stretched forward and straddling; they have been very aptly compared to the legs of a form. Very soon after this, the abdominal muscles are plainly involved, the panniculus carnosus contracts with all its might, and there is a degree of hide-bound and *tucking-up* of the belly which is seen under no other circumstances. The tail becomes in constant motion, from the alternate action of the elevators and depressors.

Further Progress.—The disease being confirmed, and having endured three or four days, the respiration becomes rapidly quickened and laborious. The pulse also, at first slightly affected, becomes quick, and small, and irregular. Constipation, and to an almost insurmountable degree, now appears. The abdominal muscles were not involved at first, and during some days the bowels retained much of their usual action, and responded, but perhaps not quite so readily as before, to the stimulus of physic; but when the aid of the abdominal muscles is lost, a very great degree of constipation must ensue.

Later Stage.—The spasm continues to extend, and to become more violent. The motion of the whole frame is lost, and the horse stands fixed in the unnatural posture he had assumed. The countenance becomes wilder, and still more haggard. Its expression can never be effaced from the recollection of him who cares about the feelings of a brute. Think of violent cramp of a single muscle or set of muscles—it makes the stoutest of us cry out; and then imagine this torture to spread over the whole frame, and to continue with little respite from day to day and week to week. True, when you approach and touch him, he moves not—he scarcely shrinks—but the sudden acceleration of the pulse tells you what he feels and fears. Still, I doubt whether the torture of our patient, or the violence of the spasm, is equal to that endured by the human being. We have no record of any bones being broken by the force of the muscular contraction—there are some cases of this in the records of human medicine, and particularly of one man, both whose thigh bones were broken by the violent contraction of the flexor muscles during a momentary remission of the extensors. The horse, in proportion to his bulk of muscle, has not the energy and power of the human being, and certainly he has not the sensibility. The human patient

is generally worn out in a few hours—the horse will labour under the disease for as many days.

The Nature of the Spasm.—Tetanus then is spasm of the whole frame—not merely of one set of muscles, but of their antagonists also; the flexors and the extensors are equally affected and fixed. The fixidity of the animal is the effect of opposed and dreadful muscular contraction. It belongs to the motor column only—the sensibility is unimpaired; perhaps, it is heightened; or if not, the compression and the lesion of so many sensitive fibrils, by the forcible contraction of the muscles, are fully sufficient to account for all the torture that the animal experiences. The organic system is even to the last scarcely involved—the horse would eat if he could—he tries to suck up a little moisture from his mash, and the avidity with which he lends himself as well as he can to assist in the administering of a little gruel—these things tell us that the feelings of hunger and thirst remain unimpaired. Digestion in the mean time goes on, and if the horse experiences difficulty in voiding his urine, it is because he has lost the aid of certain auxiliary muscles of voluntary power; or if the bowels are constipated, it is because the whole abdomen is compressed by the spasmodic constriction of its parietes, and no room is left for the peristaltic motion of the bowels to be effected. Still to the last there is appetite.

Duration.—If the disease terminates fatally, it is about the 6th, 7th, or 8th day, when, if there has been no remission, or only a slight remission of the spasms, the horse dies exhausted by hard work. The task extorted by the whip and spur of the most brutal sportsman is nothing to it.

Favourable Symptoms.—About, or a little before this time, there are sometimes evident remissions. The spasm does not quite subside, but its force is materially lessened, and the pulse becomes quieter. The jaw is not sufficiently relaxed to enable the animal to eat or to drink, or for advantage to be taken of the opportunity for the administration of medicine; and the slightest motion, or disturbance, or fright, recalls the spasmodic action with all its violence. If the remission returns, and is a little lengthened, and, particularly if there is more relaxation of the lower jaw, hope will begin to spring up: but do not hail it too eagerly, and do not remit the slightest medical attention. If the horse should recover, it will be very slowly, and he will be left sadly weak, and a mere walking skeleton.

The Post-mortem Appearances.—You would perhaps expect that examination after death would sometimes throw much light on a disease like this—you will, however, generally speaking, be grievously disappointed here. The system which almost first of all presents itself will be an exception to this remark. The muscular fibre will exhibit proof plain enough of the labour which has been exacted from it, and of its vital power being perfectly exhausted; the muscles will often appear as if they had been macerated; their texture will be softened, and they will be torn with the greatest ease. You will find much general inflammation: the lungs will in the majority of the cases be highly inflamed, for they have been labouring long and hardly to furnish arterial blood, in sufficient quantity to answer to this great expenditure of animal power. The stomach will exhibit patches of inflammation, but the intestines, in most cases, will present no diseased appearance at all.

The Brain and Spinal Chord.—You naturally examine the brain. You do not often find anything that can well be connected with the production of such a disease. Sometimes you have slight injection of the membranes, and in a few cases chronic inflammation of them. The theca vertebralis will exhibit patches of inflammation—the medulla itself will often be darker, and more vascular:—in some cases, this has reached through the whole extent of the spinal chord, in others, that which was contained in the dorsal portion of the canal was affected; and in more numerous cases there was no morbid change that was worthy of record. One fact I am compelled to record, that although believing tetanus to be a disease of the motor column principally or solely, I never could detect any inflammation about the coats of the motor nerves, or any peculiar affection of that column; but the morbid appearances, so far as they reached, seemed to involve the whole of the chord. Others have given different accounts.

The Morbid Appearance of the Locomotive Columns.—M. Gellé, professor at the Veterinary School at Toulouse, gives a very interesting description of the expected different appearance of the different columns of the spinal marrow in a tetanic horse. It is recorded in the Recueil de Médécine Vétérinaire, vol. vi. p. 246: "Having exposed the whole length of the nervous system, the cerebro-spinal fluid appeared diminished in quantity, and of a red colour. The inferior column of the spinal chord, particularly on the left side, was softened, and its white substance was pointed and mingled with blood. The gray substance was redder; the little points of blood were more numerous; and at intervals there were patches of blood. All the spinal marrow was to a certain degree softened, but less at the cervical than at the lumbar and sacral region, where it scarcely had any consistence, and was broken and torn by the

slightest touch. The roots of the nerves which proceeded from the inferior columns were of a yellowish red colour; they were easily broken and separated from the spinal chord, while the superior ganglionic roots did not appear to be in the slightest degree altered. This morbid state of the locomotive nerves was most of all marked at the lumbar and sacral regions.

Appearance of the Spinal Chord, continued.—In the number for March, 1830, of the same periodical, M. Gellé gives an account of the post mortem appearances in the spinal chord of another horse that died tetanic. "The dura and pia-mater were injected—the arachnoid membrane was healthy—the consistence of the spinal marrow was diminished—the softening was most evident in the gray substance, but it was equal on both the superior and inferior surfaces. The roots of the nerves were not softened on either surface; they possessed the character of health, except that the roots from the inferior surface were of a yellow nankeen tint, curiously contrasted with the roots from the superior surface."

Contrary Opinions.—On the other hand, M. Vatel, another Professor of the French school, says that, having had the opportunity of examining ten horses which died tetanic, he observed lesions worthy of notice in the cerebro-spinal system of two of them only.

Reflections.— Cases of tetanus do not occur to us every day in town practice, and the three last which I had terminated successfully; but in two others, after my attention had been directed to these different functions of the superior and inferior columns, I certainly did not observe this "yellowish red or nankeen appearance of the roots of the locomotive nerves." It is however a most interesting part of morbid anatomy, and I trust that you, gentlemen, will endeavour to throw some light upon it. The plain matter of fact is, that I do not believe that the spinal chord of one horse in twenty, that dies of tetanus, is carefully examined; the knacker is always in a hurry, and the examination would be a matter of impossibility at the stable of the owner. Amidst the filth of the knacker's yard it can hardly be satisfactorily conducted; and we know to our cost, that those hungry imposing fellows would charge us nearly or quite the price of the whole horse for the spine, and especially if they knew the purpose for which we wanted it. From some or all of these causes, it results that we have scarcely upon record, an examination of the post-mortem appearance of the spinal chord of a tetanic horse, and most certainly we have not one satisfactory one. We must wipe off the disgrace. The question is one of too great importance to be left thus in abeyance.

No necessity for the distinctions used by Medical Writers.—Medical writers describe various kinds of tetanus. They speak of tetanus anticus, or spasm of the flexors, bending the body forward—dorsalis, or spasm of the extensors, and bending the body backwards—lateralis, or spasm, principally of one side, and inclining the frame to that side—and erectus, including both, and keeping the frame upright and fixed. We have nothing to do with these things; ours is the tetanus erectus, affecting equally both sides of the horse, and making him sometimes a perfect fixture.

Causes of Tetanus.—These have been divided by medical writers into idiopathic and symptomatic. I would consent to acknowledge this division so far as it is generally explained, meaning by idiopathic, causes which are either unknown, or which must be referred to some general agent influencing the whole system, as cold, worms, &c.; and symptomatic, including local causes, as wounds, generally pricks in the foot—docking—nicking—the exposure of some particular part to cold; although I should observe that the term idiopathic is scarcely an appropriate one in any case. I cannot help referring the morbid action of cold, worms, &c. to some definite part, and to the lungs or the skin, or the intestinal canal, more than to any other. The truth however is, that we have comparatively few cases of idiopathic tetanus in our patients; we can usually trace the original irritation or inflammation of the nervous fibril to some particular spot, whence it was mysteriously transferred to a distant part.

The usual Causes.—If I were to select any part as more than all others the source and focus of tetanic irritation, it would be the foot. Wounds in it—a stub left in shoeing—a prick in shoeing—a stub picked up on a journey—a piece of glass wounding the frog, or penetrating to the flexor tendon, these are the prevailing sources. The horse becomes lame—the evil is discovered—it is carelessly treated—the lameness disappears—the wound however has not healed—when examined, there is an unhealthiness about it—a want of life in the neighbouring substance and vessels—and then, eight or ten days after the injury, (if three weeks had passed, all would have been safe,) locked-jaw appears.

Old Solleysel, the equerry to the French king, whose "Complete Horseman" you may read with pleasure and advantage too, after you have been well grounded in practice, and are able to select that which is really valuable (and there is a great deal of it in his book) from what is in the present day most ludicrously absurd, had no notion of tetanus proceeding from wounds. He considered it as a kind of rheumatism

brought on sometimes by violent exertion, in which they ("the horses") "strain and stretch the muscles of the neck so as to draw the humours to them; or oftener from cold, for the sudden change stirs the redundant humours, and breeds many obstructions that hinder the motion of the affected parts, and cause a pain not only in these, but also in the neighbouring parts." Therefore his remedy, next to bleeding, is to take a stimulating embrocation, and chafe the parts very hard with the hand "to make the liquor penetrate, which will heat the muscles that are cooled and stiffened by the defluxion, and so loosen the jaws and supple the neck."

Difficult to be accounted for.—Why does not the nerve of the immediate part, or those of the neighbouring ones, first take on the inflammatory action? Probably they do. Then why do not the muscular spasms first appear in the neighbourhood of the wound? I will not answer that there are no muscles in the immediate neighbourhood, because this would not apply when tetanus follows nicking or docking. I can only reply, that there is an anastomosis of nervous fibrils all over the frame, designed doubtless for a good purpose, and possibly to keep up an identity of influence everywhere. Whatever portion of the nerves of the foot may be injured, there is a connexion and communication between that and the nerve which supplies the most distant part, effected partly by means of the spinal chord, more effectually probably through the medium of the intercostals, and also by endless anastomoses between the different branches of the nerves everywhere.

But this you will tell me is no answer—why select a distant part, the nerves of the head and neck? I can only say, that nature seems fond of these distant sympathies, and that to a greater extent than we are aware, and which we do not always turn to the account which we might in the treatment of disease. I have ever been subject to the sick headache—what is the harbinger of its approach? Cold feet. What the first symptom of its preparation to depart? The return of the natural warmth of the extremities. I get wet feet, do I suffer from it in my feet or legs? no, but I reckon on a fit of the toothache, or a sore throat on the following day. There is an uninterrupted chain of nervous communication through the whole frame, and nature is fond of connecting together, in influence at least, the most distant links of that chain.

The Causes resumed.—The undeniably symptomatic causes of tetanus then are, irritation or inflammation of some nervous fibril, cut or injured by means of an operation or accidental wound; and oftener in the feet than any or every other part of the frame.

Wounds in the Feet.—With regard to wounds of the feet, I have often thought that we treat them far too carelessly. We open them, give free vent to the effused matter, apply a poultice or two, and then endeavour to heal the wound as quickly as we can by the application of the Friar's balsam, or the tincture of myrrh. The old farrier goes to work in a very rude way, but a much better one; he also opens the foot and gives vent to the pus, and then he places a pledget of tow on the wound, saturates it with spirit of turpentine, and sets fire to it. This leaves a crust upon the wound, which rarely separates from it, and gradually changes into good horn. He makes a summary business of it, and, what is most important of all, he either destroys the lacerated or injured nervous fibril which might by-and-by be the focus of mischief, or sets up a degree of temporary irritation in the part, inconsistent with, or preventing the access of, that irritability which runs on to tetanus.

The Treatment of Wounds in the Feet continued.—It would be a good rule that the surface of every wound in the foot, should be exposed to the power of some caustic. The chloride of antimony is the most manageable and the best. We should generally gain time, by causing a disposition in the part to throw out new and good horn; while, at the same time, we should destroy or deaden the exposed fibril of the nerve. The last case of tetanus which I had I could plainly trace to neglect of this kind. The horse was lame four or five days after shoeing; and, after some protracted examination, a very small stub of a nail was discovered, which the careless smith had suffered to remain, and close upon which he had driven the new nail. It was extracted, and I satisfactorily ascertained that there was no wound, but that the lameness had been occasioned by the pressure of the two nails on the sensible lamina. The shoe was put on again, the bearing taken from the place, no nail driven there, and the horse did not go lame afterwards: but on the 7th day subsequent to the examination he began to exhibit symptoms of tetanus. He recovered after a hard struggle; had I, however, freely opened the foot, and applied the chloride of antimony, he would not have been endangered at all.

Docking and Nicking.—Next to the injuries of the foot we place docking, especially if the stump has been seared too severely; and nicking, if the first bandage has not been loosened or removed sufficiently early: but after both these operations, it occasionally appears without any assignable cause, and without the possibility of attributing any blame to the operator. The

atmosphere, either its temperature or changing composition, (and I am often inclined to think, the former more than the latter,) has influence. Several horses will die one after the other in the same stables, or the same district, in consequence of these operations; and after that years will elapse before this dreadful disease will again appear.

Castration, when the colt was not properly prepared for the operation, or the searing iron was applied too severely, or the clams bound or screwed too tight, or the animal put to work too soon after the operation, or exposed to unusual cold, is occasionally followed by tetanus. Hurtrel d'Arboval relates that twenty-four horses were castrated on the same day, at the depôt at Bec, in the department of l'Eure. By some strange fancy of the riding-master, they were afterwards led, four times in every day, through a deep pond of water, that was supplied by a very cold spring. Sixteen of them died of tetanus between the 10th and 15th day after the operation. At Rennes, a horse, after castration, was exercised until he was covered with perspiration, and then suddenly plunged into the river. He died tetanic. He had been previously condemned, and this was done by way of experiment. He also states, and they are very important facts, that the Americans used to have recourse to the cautery in the castration of their horses and mules, and that tetanus was so frequent, that the price of the horse or mule became doubled when he had recovered from the operation; and that bulls in whom the hemorrhage was arrested by the application of a caustic, were not exempt from fatal attacks of tetanus after castration. He also adds, that M. Gélin, an American veterinary surgeon, has assured him, that this disease never attacks those that are operated on by the use of the clams in the uncovered way.

Tetanus cured by Castration.—While castration appears to be so frequent a cause of tetanus, M. Taffanel has inserted in the Recueil de Méd. Vét. for August 1830, an account of the cure of tetanus by this operation. An entire horse, nine years old, which had always been most annoyingly salacious, was suddenly seized with tetanus from some cause perfectly unknown. The usual means were adopted, but the 14th day arrived, and the animal became worse and worse; every muscle was fixed, and the breathing so laborious as to threaten immediate death. In the early period of the disease, the horse had not, even amidst his extremity of suffering, forgotten his old propensities, and had neighed, whenever a mare approached, and had endeavoured as well as he could to join her. M. Taffanel happened now to meet with a fellow practitioner, to whom he was relating the circumstances of the case, and who told him that he had had an entire horse under treatment for tetanus under very similar circumstances, and that, all other means failing, he had castrated him, and cured him too. It was determined that this patient should submit to the operation, and perhaps under the circumstances, the most judicious mode of operating was adopted—namely, that of tortion and tearing of the chord. The horse could not be securely hobbled on account of his extreme irritability, and therefore it happened that the chord of the left testicle was not sufficiently twisted, and it bled for four hours, and eight pounds of blood were lost. During the operation, the horse uttered the most plaintive cries; the muscles of the face and of the abdomen, were even more violently contracted than before; the breathing became much more laborious, and it seemed to be impossible that he could survive, but all this quieted down. On the second day, the tetanic spasm was so diminished that he could eat a little green meat; and on the 15th day after the operation, he was dismissed cured. This was applying the principle of counter-irritation with a vengeance—it belongs, however, to another part of my subject.

Over-fatigue, exciting causes, and sudden change of temperature.—Our scanty records of veterinary matters, contain numerous instances of tetanus following exertion brutally exacted beyond the animal's natural strength, in the draught of heavy loads. Horses that have been matched against time, have too frequently died tetanic, a little while afterwards. Sudden exposure to cold, after being heated by exercise has produced this dreadful state of nervous action, and especially if the horse has stood in a partial draught; but of all the causes of this nature, the dripping of cold water upon the loins, has been the most fatal, with the exception perhaps of the animal's drinking his fill of cold water when he was profusely perspiring after exercise.

Diseases producing or followed by Tetanus.—I might present you with a long list of these. There is scarcely a disease that has not been complicated with tetanic symptoms in some of its stages. Many have degenerated into, or have yielded to the overwhelming power of this dreadful spasm. *Suppressed strangles* have not unfrequently been followed by tetanus; and there is one case in which, although the tumour suppurated, the discharge was not so great as it ought to have been, and tetanus closely followed the healing of the wound. *Worms* have been accused, and not always falsely, of being the exciting cause of this disease. The teres, and even the ascaris, may produce sufficient disturbance in the intestinal

canal, to cause, in irritable habits, even tetanus itself; but we must acquit the harmless, yet dreaded bot, who only occupies that habitation which nature designed for him, while preparing to assume his perfect form. I have seen one case, and there is the record of another, in which *glossanthrax* either accompanied or was the cause of tetanus. I certainly used boldly, and to their full extent, the usual means for quieting this fearful nervous erythism, but I added to it, so far as the nearly closed state of the jaws would permit me, the deep lancing of the vesicles beneath the tongue, and that from end to end. They speedily disappeared, the violence of the tetanic spasm began soon afterwards to remit, and the horse recovered. *Distention of the Stomach* has been accompanied by tetanus. We do not often see a case of staggers, of the violent kind, in which there are not occasional spasmodic contractions of the muscles, which bear no little resemblance to tetanus; and, in a few cases the lesser disturbance of the nervous system has merged in the greater one. *Chronic cough and a tuberculated state* of the lungs, accompanied by breathing unusually laborious, have had this termination; the sudden absorption of pus, whether from vomicæ of the lungs, or abscesses of any kind, have thrown a weight on the constitution, the effort to get rid of which has produced a state of general irritation terminating in tetanus. *The irritability of weakness* has produced the same effect. A horse was evidently recovering from some disease of long continuance, and of an enfeebling nature, and nothing but common care was wanted to ensure the return of perfect health: the animal, however, was exposed to some circumstances of excitement; he worked too early and too much, or he was suffered to gorge himself with food, and then all at once tetanus came on, and he was irrecoverably lost.

Lecture XLVIII.

THE TREATMENT OF TETANUS.—BLEEDING.—PURGING.—OPIUM.—BLISTERS OBJECTED TO—ALSO APPLICATION OF FOOD.—SHEEPSKINS RECOMMENDED.—OPIATE FRICTIONS.—FOOD.—ATTENTION TO THE LOCAL CAUSE.

Treatment.—I have to speak this evening, gentlemen, of the cure of tetanus. This is a most unsatisfactory portion of my subject. The indication of cure is plain enough: the system must be tranquillized. Aye! but how? I have found,—every veterinary surgeon I believe has found—this to be an exceedingly difficult affair, and we have failed oftener than we have succeeded. There is one exception indeed—that of Mr. Wilkinson, who, in a treatise which he published on this disease, gives us a list of cases in which the successful ones were almost or quite (for I have not the book now at hand) three to one. Mr. Wilkinson was a respectable and skilful practitioner; and here, it would seem, a fortunate one too; and far more fortunate than you will be, especially if you pursue the whole of his plan of treatment, which is seriously objectionable on various accounts.

Venesection.—You will anticipate me in the first thing which I should recommend. Bleed—bleed copiously—abstract as much blood as you can get. Nothing is so likely to lessen such an extreme state of nervous erythism as this. There is no more powerful sedative than venesection carried to its proper extent in cases of muscular spasm. We effect a double purpose—we lessen the determination of blood to the common sensorium and to the origins of the nerves, and by which they were enabled, if I may so express myself, to secrete and to pour out this torrent of nervous influence—we lessen the supply of blood to the muscular system, and by the vivifying power of which alone that system is enabled to respond to the stimulus. There are many diseases in which we may well hesitate as to the propriety of bloodletting, at least to the extent which I recommend here; but in tetanus there cannot be a doubt about the matter; you take away the pabulum, the nervous and the muscular systems, the life of both—the capability of acting in the one, and of being acted upon in the other. Therefore, my advice would be—founded both on theory and experience—On the first access of tetanus, bleed; and bleed until the horse falters or falls.

The different Degree of Resistance to the effect of the Loss of Blood.—I have often, gentlemen, endeavoured to impress on your minds the change which different diseases produce, temporarily at least, in the constitution, as it regards the power of bearing the abstraction of blood; and I may add the perfect change in different stages of the same disease, and in different animals of the same species, and in the same animal at different times. I have had for my object in this, to put an end to the idle and mischievous practice of directing specific quantities of blood to be taken, and leaving to an assistant the abstraction of that blood; and also to impress deeply on your minds this golden rule, this rule without exception, that your bleedings must be regulated by the effect which they produce on the circulation. Bleed until the pulse falters. If I ever allowed you to go beyond that, it would be here. In acute inflammation, and particularly local inflammation, and more of

a serous than a mucous membrane, there is a resistance to the effect of the loss of blood, obstinate beyond what you would think possible. I have more than once taken away 20lbs. of blood, before I could accomplish my object; but I have uniformly persisted, and sometimes to the great terror of the owner. I have never had occasion to repent of having done so. I take this resistance to the loss of blood as one of the strongest proofs I can have of the intensity of the inflammation, or the extreme degree of irritability; and as one of the plainest indications of the necessity of bleeding, and an important guide in my prognosis. Forgive repetition here, for this is the corner-stone of all good practice.

Objections answered.—But do I not diminish that general strength which the animal will by-and-by need to enable him to support the protracted and violent spasm? —Do I ultimately weaken the horse when I bleed him until he drops, in order to lessen, or possibly knock down at once, inflammation of some vital organ? I should weaken him by suffering the disease to prey upon his frame. I should weaken him by small and repeated bleedings which sapped *his* vital power, but diminished not in the slightest degree the power of the enemy. This is an argument of the old school, and unworthy of the present state of veterinary science. The grand principle of veterinary practice, which I shall not have laboured in vain if I can establish in your minds, is to subdue inflammatory action by the promptest and most efficient means—depletion. I speak of no specific quantity to be taken away; but I give you an unerring guide—the pulse. While that remains firm bleed on: you are attacking the disease, and not in the slightest degree hazarding the permanent strength of the patient.

I am fully aware that if I was advocating this mode of treating tetanus in the human subject, I should have the opinion of the best pathological writers decidedly against me; and as it is, I know that I am opposed to some, but not many excellent veterinary practitioners. Perhaps I should say, even then, that the objection to venesection has been oftener supported by the mere ipse dixit of the author, than by any appeal to fact, or even to sound pathological reasoning; and I should repeat that I could not act on a sounder pathological principle, than to endeavour to withdraw as much as I could of that which I have described, as the life of both the systems involved—that to the presence of which the one owes its capability of acting, and the other its power of being acted upon; the menstruum, by the interposition of which, if I may dare say so, the different electricities of the two substances are developed, and the galvanic effect produced. But I am a mere veterinary surgeon, addressing veterinary pupils. I am describing the diseases of quadrupeds, and the proper medical treatment of them; and I must not be deterred from following my own course, either by the somewhat unfounded prejudices, or the soundest inductions of human practitioners, or even the most overwhelming accumulation of facts as it regards the human being.

A Case stated.—About four years ago I saw, I trust for the credit of human nature, a very rare case of tetanus. A cab-man who had been seen driving his horse about town from an early to a late period of the day, came not back to the stables at the appointed hour. The night passed and he came not; but in the course of the following day the cab-master received intelligence that his horse, looking like a dog-horse, had been seen at the door of a public-house thirty miles from home. He immediately dispatched one of his men with a constable, by coach in that direction, with peremptory orders, wherever they found him, and whatever might be the state of the poor animal, to put the fellow into the cab, and to make the best of their way home, that as the sessions were just commencing, he might have the pleasure of punishing the scoundrel without delay. They found him early in the morning of the second day. They ascertained that he had been driving in every direction about the country; that the horse had not been taken out of the cab, that, the contents of the nose-bag being consumed, he had had nothing but an occasional wisp of hay, and not always that, where the fellow stopped to bait himself; and, in fine, that the animal was in the most dreadful state of exhaustion: but they knew the brutal character of their master, and that he would sacrifice a dozen horses, and this among the rest, although he was his very best, rather than delay his vengeance an instant. In fact, they were as bad as himself, they put the driver into the cab, and whipped on the poor horse, and accomplished their journey home, thirty-six miles, in little more than three hours, and with merely pulling up once to water the exhausted animal for a few minutes. The scoundrel master did not expect them so soon, and was out of town; and as the horse was distressed to a most pitiable degree, and in the opinion of the ostler something worse was coming upon him, I was sent for. I saw him within a quarter of an hour after his arrival, and he was perfectly tetanic.

The Case continued.—Did I act upon my system of bleeding here? No; but I ordered him to be made as comfortable as possible, and I gave him a good cordial